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# Commercial Fisheries Abstracts

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# UNITED STATES DEPARTMENT OF COMMERCE

Maurice H. Stans, Secretary

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Robert M. White, Administrator

## NATIONAL MARINE FISHERIES SERVICE

Philip M. Roedel, Director

### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



0.321  
(1.93) (0.6) USE OF FROG EGGS AND OOCYTES FOR THE STUDY OF MESSENGER RNA AND ITS TRANSLATION IN LIVING CELLS

Gurdon, J. B., C. D. Lane, and H. R. Woodland (Department of Zoology, South Parks Road, Oxford, England) and G. Marbaix (Department of Molecular Biology, University of Brussels, Rhode-St.-Genèse, Belgium)  
Nature 233, No. 5316, 177-182 (September 17, 1971)

Oocytes injected with hemin and purified 9S RNA from rabbit reticulocytes will synthesize hemoglobin, an effect that RNAs from other kinds of reticulocyte do not produce. Hence the authors postulated that microinjection of frog oocytes and eggs with messenger RNA might provide a useful experimental system for identifying and studying the translation of different kinds of messenger RNA. Therefore they examined the conditions associated with the successful translation of injected messenger RNA, the treatment of recipient cells, the duration and efficiency of hemoglobin message translation, and the potential use of the experimental system for translating messages other than that for hemoglobin.

The authors introduced labeled amino acids into the eggs and oocytes of *Xenopus laevis*, followed the rate of synthesis of hemoglobin after the injection of rabbit 9S RNA, and compared it with the rate of translation of endogenous messengers. (Since <sup>3</sup>H-histidine leaked out of injected oocytes rapidly and penetrated eggs from a labeled incubation medium very poorly, they labeled the eggs by injection and the oocytes by incubation.) This article describes in detail how to use *Xenopus* eggs and oocytes as an extremely sensitive assay system for identifying messenger RNA and for studying translational control in living cells. (over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 1 PAGE 1

0.32 PROTEIN METHYLATION

Paik, Woon Ki, and Sangduk Kim (Fels Research Institute, Temple University School of Medicine, Philadelphia, Pa. 19140)  
Science 174, No. 4005, 114-119 (October 8, 1971)

The structure of a protein molecule is primarily defined by the sequence of the constituent amino acids. The structures of certain proteins are further modified after genetic translation by changes in the constituent amino-acid residues. Such changes result from (for example) hydroxylation, phosphorylation, acetylation, methylation, and thiolation. Because the protein methylation process might have important effects on the control of protein function *in vivo*, the authors, in this article, review the present status of knowledge on the methylation of protein with particular emphasis on the problem of methylation of lysine, arginine, and free carboxyl groups in proteins. The subject areas (headings) considered are: Natural Occurrence of the Methylated Amino Acids; Identification of the Methylated Amino Acids; Methylation Occurs After the Formation of Peptide Bonds; Properties of Protein Methylases; Theoretical Consideration of Protein Methylation; and Biological Significance [of protein methylation]. The authors conclude, in part, that because methylated amino acids are found in such highly specialized and well-characterized proteins as actin, myosin, cytochrome c, encephalitogenic basic protein, and glycine-rich, arginine-rich histone, research on protein methylation should result in a better understanding of cellular control processes.

[3 tables, 78 references]

FTP

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0.34  
(1.89) CHARACTERIZATION OF THE PRINCIPAL STEROIDAL SAPONINS OF THE STARFISH *MARTHASTERIAS GLACIALIS*: STRUCTURES OF THE AGLYCONES

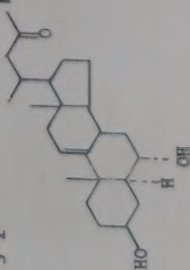
Turner, A. B., and D. S. H. Smith (Department of Chemistry, University of Aberdeen, Aberdeen AB9 2UE, Scotland) and A. M. Mackie (Natural Environment Research Council, Fisheries Biochemical Research Unit, University of Aberdeen, ABL 3RA Nature 233, No. 5316, 209-210 (September 17, 1971)

Steroid glycosides isolated from extracts of starfish induced avoidance reactions in the edible snail *Buccinum undatum*. One of the major glycosides was a mixed conjugate of a  $\Delta^{24,23}$ -ketocholestan derivative. The authors discuss the composition of the mixture and present evidence for the nuclear structure of the aglycone. The structures proposed for the major aglycones are 3 $\beta$ ,6 $\alpha$ -dihydroxy-5 $\alpha$ -cholesta-9(11),24-dien-23-one (marthasterone, II) and its 24,25-dihydro-derivative (III). Two structural features of these molecules are worth noting: (1) the keto groups at position 23 are unique, oxygenation at this position in the side chain having been found before in nature only in 23 $\xi$ -hydroxylanosterol; and (2) the sterols have a  $\Delta^7$ -bond<sup>11</sup>, as do the sterols of sea cucumbers.

[16 references]

[II: R=CH=C(CH<sub>3</sub>)<sub>2</sub>]

[III: R=CH<sub>2</sub>CH(CH<sub>3</sub>)<sub>2</sub>]



LB

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 1 PAGE 1

0.35  
(9.19) METHYLATION OF MERCURY COMPOUNDS BY METHYLCOBALAMIN

Bertilsson, Leif, and Halina Y. Neujahr (Department of Pure and Applied Biochemistry, The Royal Institute of Technology, S-100 44 Stockholm 70, Sweden)  
Biochemistry 10, No. 14, 2805-2808 (July 6, 1971)

This paper describes the nonenzymatic methylation of mercuric chloride and certain other mercury compounds by methylcobalamin (a vitamin B<sub>12</sub> derivative found in Nature) in water solutions. The rate of the reaction was measured by means of a spectrophotometric method based on the absorbance changes at 351 and 380 nm. That occur during the conversion of methylcobalamin into hydroxycobalamin. The methylmercury formed from Hg<sup>2+</sup> was analyzed by gas chromatography. The effects of thiol compounds and cell extracts of *Escherichia coli* 113-3 on the reaction were examined.

Methylcobalamin reacted rapidly with mercuric chloride and at a slower rate with organic mercury compounds in water solutions. The final reaction products from the mercuric chloride were hydroxycobalamin and methylmercury cation. Under certain experimental conditions the reaction is rapid in unbuffered aqueous solution, reaching 50% completion in 4 min.

The reaction is inhibited by the presence of tris and phosphate buffers, thiol compounds, and cell proteins (extracts from cells of *E. coli*)--presumably by binding of Hg<sup>2+</sup>.

[4 figures, 20 references]

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COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 1 PAGE 1



<p>0.35 (0.7)</p> <p>THE UTILITY OF FASTING ESSENTIAL AMINO ACID PLASMA LEVELS IN THE FORMULATION OF NUTRITIONALLY ADEQUATE DIETS. PART I. SPRAGUE-DAWLEY RATS</p> <p>Jarowski, C. I., A. V. Puccini, M. Winitz, and M. C. Otey (Department of Pharmaceutics, St. John's University, College of Pharmacy, Jamaica, N.Y.) <u>Agricultural and Biological Chemistry</u> <b>35</b>, No. 7, 1007-1017 (July 1971)</p> <p>Earlier work by various researchers has indicated that postprandial changes in plasma amino-acid levels may be dependent upon the amino-acid composition of the protein ingested. Further, procedures for predicting limiting amino acids on the basis of postprandial plasma levels have been proposed. The authors used published nutritional data to demonstrate that an interrelationship may exist between the fasting plasma amino-acid profile and the minimum daily intake required. By taking into account the proportions of fasting amino-acid plasma levels of Sprague-Dawley rats the authors were able to develop two equally effective diets within a 4-week period. [7 tables, 24 references]</p> <p>FTP</p>	<p>0.38 (0.38)</p> <p>STRUCTURED BIOLUMINESCENCE. TWO EMITTERS DURING BOTH THE IN VITRO AND THE IN VIVO BIOLUMINESCENCE OF THE SEA PANSY, <u>RENILLA</u></p> <p>Wampler, John E., Kazuo Hori, John W. Lee, and Milton J. Cormier (Department of Biochemistry, University of Georgia, Athens, Ga. 30601) <u>Biochemistry</u> <b>10</b>, No. 15, 2903-2909 (July 20, 1971)</p> <p>Y. D. Karkhanis and M. J. Cormier [<u>Biochemistry</u> <b>10</b>, 317 (1971)] isolated luciferase, a low molecular weight energy conversion enzyme, from the sea pansy, <u>Renilla reniformis</u>. The enzyme catalyzes the bioluminescent oxidation of <u>Renilla</u> luciferin to produce light. Further, they showed that at low enzyme concentration the in vitro reaction results in a blue structureless emission with a maximum at 20,500 cm<sup>-1</sup> (488 nm.). In the present paper, the authors report that the in vivo emission from whole animals [an emission which consists of a very narrow, structured green luminescence having a maximum at 19,640 cm<sup>-1</sup> (509 nm.)] can be accurately matched by the in vitro bioluminescent reaction at high enzyme concentration. They isolated a product having fluorescence properties similar to that of the broad blue emission. Further, they showed that a protein-bound chromophore associated with luciferase preparations had fluorescence properties identical with the narrow green bioluminescence emission. The results indicate two distinct emitting species.</p> <p>[5 figures, 2 tables, 17 references]</p> <p>FTP</p>
<p>0.321 (1.93)(0.6)</p> <p>STEREOCHEMICAL AND VIBRATIONAL THEORIES OF ODOUR</p> <p>Amore, J. E. (Western Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Albany, Calif.) <u>Nature</u> <b>233</b>, No. 5317, 270-271 (September 24, 1971)</p> <p>The author shows, statistically, a strong correlation between the odor quality of a compound and its molecular shape.</p> <p>[1 figure, 1 table, 5 references]</p> <p>FTP</p>	<p>0.38 (1.87)</p> <p>ENOLASE FROM LOBSTER (<u>HOMARUS AMERICANUS</u>)</p> <p>Chapman, M. John, Christopher Chin, and Finn Wold (Department of Biochemistry, University of Minnesota, Medical School, Minneapolis, Minn. 55455) <u>Journal of the Fisheries Research Board of Canada</u> <b>28</b>, No. 6, 879-882 (June 1971)</p> <p>Comparative studies of functionally analogous, phylogenetically different enzymes can serve two purposes: (1) the ordering of organisms according to phylogenetic relations and the establishment of biochemical evolutionary trees; and (2) the determination of common invariant structural components of the enzymes and the clarification of the active site of enzymes. Since glycolysis is virtually ubiquitous, and such studies must be of enzymes common to all species, the authors studied enolases from a variety of organisms and compared their properties. In this part of the study, they isolated and characterized enolase from lobster muscle. The catalytic properties of the enolase from lobster were quite similar to those from rabbit and trout. One notable feature that distinguishes the physical and chemical properties of lobster enolase from the others is its sensitivity to cold-freezing and thawing once completely destroys its activity. Also, as distinguished from salmonoid enolases, all of which have three enolase isozymes in characteristic proportions, lobster enolase apparently exists in a single molecular form. [4 figures, 2 tables, 12 references]</p> <p>LB</p>



0.38

[COMPARATIVE BIOCHEMISTRY OF ISOENZYMES. VI. ISOENZYMES OF MALIC DEHYDROGENASES OF CARCASS MUSCLE OF VERTEBRATES] LA BIOCHIMIE COMPAREE DES ISOENZYMES. VI. ISOENZYMES DES DESHYDROGENASES MALIQUES DES MUSCLES SQUELETTIQUES DES VERTEBRÉS

Șerban, M., and Dita Cotariu (Institut de Biochimie, Laboratoire de Protéines) Revue Roumaine de Biologie -- Série de Zoologie 15, No. 3, 181-187 (1970) (In French; English abstract) (296 Splaiul Independentei, București, Republica Socialistă România)

The authors investigated the two forms of malate dehydrogenase (MDH) muscle isoenzymes--cytoplasmic and mitochondrial--in two species of fish, two of amphibian, two of reptile, two of bird, and three of mammal. MDH isoenzyme patterns were described, and their characteristics were related to the species' evolutionary degree of development, to certain evolutionary changes and adaptations of the enzymatic protein system, and to modifications of the metabolic processes. These patterns were not organ specific--rather, they were species specific only.

LB

[3 figures, 1 table, 14 references]

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0.5

STRUCTURAL CHANGES IN CLOSTRIDIUM BOTULINUM TYPE E AFTER TREATMENT WITH BOTICIN S51

Ellison, Jane S., Carl F. T. Mattern, and Wendell A. Daniel (Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204, and National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md. 20014)

Journal of Bacteriology 108, No. 1, 526-534 (October 1971)

The purpose of this study was to determine whether the mode of action of boticin S51 (a bacteriocin produced by a nontoxicogenic organism related to Clostridium botulinum type E) is similar to that of the bacteriocinlike substance from phage type 71 Staphylococcus aureus. Treatment of C. botulinum type E strain 070 with boticin S51 caused extensive changes in the structure of the cell. The morphological changes in the boticin-treated sensitive C. botulinum type E strain 070 cells were similar to those produced by bacteriocinlike substance from phage type 71 S. aureus on sensitive  $\beta$ -hemolytic streptococci.

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[7 figures, 18 references]

BIOCHEMICAL PROPERTIES OF KLEBSIELLA ISOLATED FROM FISH

Sudakov, N. V. (Beloruss. Gos. Univ. im. Lenina, Minsk, U.S.S.R.) Chemical Abstracts 74, No. 25, 136756m (June 21, 1971)

0.5

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0.6  
(0.37)

DIFFERENTIAL THERMAL ANALYSIS OF FROZEN FOOD SYSTEMS. I. THE DETERMINATION OF UNFREEZABLE WATER

Duckworth, R. B. (Department of Food Science, University of Strathclyde, 131 Albion Street, Glasgow C.1, Scotland) Journal of Food Technology 6, No. 3, 317-327 (September 1971)

This article describes a method, using differential thermal analysis, for the determination of unfreezable water in food materials and it presents some of the results obtained. By use of the differential thermal analysis technique, difference in temperature,  $\Delta T$ , between a test substance and a thermally inert reference material is recorded as samples of the two substances are warmed or cooled over a suitable range of temperature. If the test substance is thermally active, then the curve obtained by plotting  $\Delta T$  against sample temperature shows one or more peaks (or irregularities). These peaks indicate the occurrence and measure the extent of energy-involving reactions, transitions, or phase changes within the test sample over the range of temperature employed. Results are given for various food materials and food constituents (cellulose, starch, pectin, agar, albedo, bean, Brussels sprout, cabbage, carrot, celery, pea, potato, gelatin, egg white, egg albumin, beef muscle, and cod muscle) and are compared with values obtained by other workers using various other techniques. The differential thermal analysis technique is simple and direct and is free from the uncertainties present in most of the methods previously employed.

[2 figures, 1 table, 37 references]

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0.7

AVAILABILITY OF IRON

Anonymous

Nutrition Reviews 29, No. 10, 234-237 (October 1971)

The availability of iron in iron compounds or in foods has been compared with that of ferrous sulfate by evaluating the regeneration of hemoglobin in chicks and rats depleted of iron.

It is clear that the iron of various salts used in fortification and the iron in foods varies widely in availability. The reasons for these variations are not clear. It should be noted that considerable variation is reported for different samples and even for the same sample in these tests. For example, a single sample of ferric chloride is reported to vary from 26 to 67 per cent, six samples of reduced iron to vary from 8 to 66 per cent, and two samples of fish protein concentrate from 8 to 53 per cent. Similar large variations were obtained in the collaborative study when the same iron sources were assayed in different laboratories. Thus there is the suggestion in the data that much of the variation is simply due to errors in the assay rather than true differences in the potency of the materials tested.

Reprinted

The author discusses the relationships between polyunsaturated fatty acids and aging in man, atherosclerosis and certain forms of cancer. D.M.L. Reprinted

Rev. fr. Cps Gras 18, No. 4, 203-206 (1971) (In French, English summary) BEMICA Abstracts 24, Supplement, Abstract No. 2414, 498 (July/August 1971)

DIETARY FATS, THEIR EFFECTS ON LIFE EXPECTANCY

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0.5  
(5.5)

VIBRIO PARAHAEEMOLYTICUS--A REVIEW

Nickelson, R. R., and C. Vanderzant (Animal Science Department, Texas A&M University, College Station, Tex. 77843)

Journal of Milk and Food Technology 34, No. 9, 447-452 (September 1971)

This article is a review of current information on the taxonomic position, biochemical characteristics, distribution, isolation and identification procedures, pathogenicity, and serology of *Vibrio parahaemolyticus*. The organism has been associated with outbreaks of gastroenteritis in Japan caused by consumption of seafoods and other salted foods. Some strains may also cause localized tissue infections in humans and cause death of crab and shrimp. Recently, the organism was isolated from marine environments and seafoods in many other countries including the United States. [43 references]

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0.5  
(1.85)(0.8)

THE BACTERIOLOGY OF 'SCAMPI' (NEPHROPS NORVEGICUS).  
III. EFFECTS OF PROCESSING

Hobbs, G., D. C. Cann, Barbara B. Wilson, and R. W. Horsley (Torrey Research Station, Aberdeen, Department of Trade and Industry, Aberdeen, Scotland)

Journal of Food Technology 6, No. 3, 233-251 (September 1971)

This article reports on the examination in five plants of the effects of handling and processing on the bacteriology of shrimp. The authors checked the production for frozen shrimp and frozen breaded shrimp, and also examined the bacteriological aspects of automated polyphosphate treatment of the shrimp. No significant increase or decrease in the numbers of any of the various types of bacteria during processing was found. During ice-storage of the shrimp, bacteria of the *Pseudomonas-Achromobacter* group predominated. [9 tables, 16 references]

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(1.85)(0.8)

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0.7  
(5.5)

EFFECT OF ASCORBIC ACID ON CADMIUM TOXICITY IN THE YOUNG COTURNIX

Fox, M. R. Spivey, Bert E. Fry, Jr., Barbara F. Harland, M. E. Schertel, and Cora E. Weeks (Division of Nutrition, Food and Drug Administration, Department of Health, Education and Welfare, Washington, D.C. 20204)

Journal of Nutrition 101, No. 10, 1295-1305 (October 1971)

This study was designed to evaluate the effects of supplements of individual dietary components in altering the toxicity of dietary cadmium. Day-old coturnix (Japanese quail) were fed 75 mg Cd/kg of an adequate purified diet for 2- or 4-week periods. Cadmium produced moderate growth retardation, severe anemia, decreased ash content of the tibia, and deviations from the normal concentrations of zinc, iron, cadmium, copper, and calcium in one or more of the cells or tissues assayed (erythrocyte, liver, kidney, and tibia). Dietary supplements of zinc, iron(III), copper, and L-cysteine.HCl and injected ascorbic acid produced slight to moderate protection against cadmium-induced anemia, whereas iron(II), ascorbic acid, and D-isoscorbic acid had marked effects in preventing the anemia, growth retardation, poor bone mineralization, and perturbations in elemental concentrations of tissues. Chromium, cobalt, selenium, nickel, molybdenum, and pteroyl-glutamic acid had no effects. Cadmium did not affect the total ascorbate content of the liver. Removal of dietary ethoxyquin did not affect the toxicity of cadmium or the protective effects of ascorbic acid. Initiation of ascorbic acid feeding at 2 weeks was beneficial to birds fed cadmium throughout the 4-week experiment. Under the conditions of these experiments, cadmium produced a functional iron deficiency and less clear-cut effects on zinc function. It appears that a primary effect of cadmium was to prevent absorption of dietary iron(III). [9 tables, 33 references]

Authors' abstract

0.7  
(5.5)

CHEMICAL STRUCTURE AND PROTEIN STABILIZATION ACTIVITY OF CARBOXYMETHYL CELLULOSE

Asano, Yusuke, and Yoichi Ishida (Research Laboratory of Meiji Milk Products Co., Ltd., Higashimurayama, Tokyo, Japan)

Agricultural and Biological Chemistry 35, No. 7, 1018-1023 (July 1971)

Carboxymethylcellulose (CMC) precipitates casein micelles from milk at neutral pH but CMC stabilizes casein under acidic conditions. Commercial samples of CMC vary in their ability to stabilize casein. In this study the authors determined the effect of the distribution of substituents in CMC molecules on the stabilization characteristics of the CMC on milk proteins. The distribution of the substituent per glucose unit of CMC did not vary significantly among 6 commercial samples. However, the distribution of substituents along the cellulose macromolecule did vary significantly; four samples that were fairly heterogeneous could stabilize 8-10% casein at pH 5.0 and 5°C.; the other two samples could not completely stabilize the protein. [3 figures, 6 tables, 18 references]

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Careful studies in several patients have shown variable feedback control of cholesterol synthesis in response to changes in dietary cholesterol. Compensatory excretion of cholesterol and reduction in synthesis occurred unpredictably in response to an increase in dietary intake of cholesterol.

[3 references]

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(5.5)

DIETARY CHOLESTEROL VERSUS TOTAL BODY CHOLESTEROL

Anonymous

Nutrition Reviews 29, No. 9, 199-201 (September 1971)

0.5  
(1.85)(0.8)

MOTILE MARINE BACTERIA. IV. IONIC RELATIONS OF MARINE AND TERRESTRIAL BACTERIA

Lelison, Einar (Stritch Sch. Med., Loyola Univ., Hines, Ill.)

Chemical Abstracts 74, No. 23, 121851q (June 7, 1971)

The toxicity of DDT is attributed to its effect on the central nervous system. DDT produces an excitatory effect on axons. In order to define the molecular basis for the action of DDT, further information on the nature of its interaction with the component molecules of complex lipids. Data are lacking on the interaction of DDT with complex lipids. In this article the authors discuss the interaction of DDT with lecithin and DDT as it is defined by nuclear magnetic resonance spectroscopy. Apparently an interaction between DDT and lecithin occurs as indicated by the reciprocal effects of each compound on the proton magnetic resonance spectrum of the other. The authors state that the phosphoryl choline moiety of lecithin and the benzylic proton of the DDT seem to be involved. [1 figure, 1 table, 11 references]

FTP



0.7  
(0.32) (6.54) COMPARISON OF THE UTILIZATION OF SUPPLEMENTED WHEAT GLUTEN  
AND OTHER AMINO ACID SOURCES IN THE RAT

Cook, Richard A. (School of Human Development and Department of Biochemistry, Maine Agricultural Experiment Station, University of Maine, Orono, Maine 04473), Frederick H. Radke, and Herman De Haas

Journal of Agricultural and Food Chemistry 19, No. 4, 703-706 (July-August 1971)

Over the past 5 years, several investigators have found that people, rats, and pigs utilize the N in casein-lactalbumin (5:1) diets more efficiently than they do that in wheat-gluten diets. This study is an examination of two aspects of these findings--the effect of (1) N level and (2) feeding duration on N utilization. First, the authors fed rats wheat-gluten diets supplemented with 1.2, 2.4, 3.2, 4.0, 4.8, or 8.0% N for 2 weeks. Taking the level at which the ratio of g-N retained/g-N consumed was highest (2.4%), they then fed similar rats wheat gluten, casein-lactalbumin, or pure amino acids at the 2.4% N level for 2, 4, 6, or 8 weeks, evaluating growth and utilization of dietary N at the end of each time period.

Rats fed the casein-lactalbumin diet gained more weight after 2, 4, and 6 weeks and attained higher carcass fat levels after 4 weeks than the other rats did. Rats fed wheat gluten showed greater carcass protein levels and higher ratios of g-N retained/g-N consumed. Rats fed pure amino acids showed no statistically significant growth or N utilization characteristics that would indicate such a diet is superior to either an animal- or a plant-protein diet. Four conclusions indicated by these results are that (1) both dietary nitrogen level and length of feeding period must be considered when the utilization of amino acids for protein formation is evaluated; (2) when fed under the dietary conditions described here, (over)

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0.7  
(6.195) EFFECT OF EXCESS LEVELS OF INDIVIDUAL AMINO ACIDS  
ON GROWTH OF RATS FED CASEIN DIETS

Muramatsu, Keiichiro, Hisashi Odagiri, Shigeyoshi Morishita, and Hisanao Takeuchi (Laboratory of Food and Nutrition, Department of Agricultural Chemistry, Shizuoka University, Iwata, Shizuoka-ken, Japan)

Journal of Nutrition 101, No. 9, 1117-1125 (September 1971)

Previously reported work by various investigators has shown that the addition of excessive amounts of individual amino acids to a low protein diet usually causes a depression in growth, a decrease in food intake, and sometimes, the development of pathological lesions in young rats. However, certain discrepancies apparent in the earlier work may be due to environmental conditions under which the tests were carried out or to the forms (DL- or L-forms) of amino acids used in the tests.

The present study was carried out to clarify the problem by determining the relative severity of the depression of growth in weanling rats that results from supplementing a low protein casein diet with excessive amounts of each of 18 L-amino acids. Also, methionine and glycyl-L-glutamine were fed at several different levels to the rats to determine the effect of level of amino acid on the retardation of growth.

When the rats were fed a 10% casein diet containing 0.5% of the individual amino acids, varying degrees of depression of growth of the rats resulted. Alanine, proline, glutamic acid, leucine, and arginine caused no or slight depression (0 to 0.15%) of growth. Isoleucine, aspartic acid, lysine, valine, threonine, glycine, cysteine, serine, tryptophan, and histidine caused a moderate (30 to 80%) depression of growth. Tyrosine, phenylalanine, and methionine caused the most severe depression (100 to 120%) of growth.

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0.7  
SCANDIUM, CHROMIUM(VI), GALLIUM, YTTRIUM, RHODIUM, PALLADIUM,  
INDIUM IN MICE: EFFECTS ON GROWTH AND LIFE SPAN

Schroeder, Henry A., and Marian Mitchener (Department of Physiology, Dartmouth Medical School, Hanover, N.H. 03755; and Brattleboro Memorial Hospital, Brattleboro, Vt. 05301)

Journal of Nutrition 101, No. 10, 1431-1437 (October 1971)

In order to evaluate possible innate toxic effects of small doses of scandium, hexavalent chromium, gallium, yttrium, indium, rhodium and palladium in terms of growth and survival, 958 mice divided as to sex were raised in an environment limited in metallic contamination and given 5 ppm metal in drinking water from weaning until natural death. Body weight was measured at monthly intervals up to 6 months, at 1 year and at 18 months of age. The feeding of gallium was accompanied by significant but not marked suppression of weight at 14 of 16 intervals in both sexes; the feeding of scandium was associated with growth suppression at 10, of indium at 8, of palladium at 7 and of rhodium at 6 of 16 intervals compared to mean weights of controls. The feeding of yttrium and hexavalent chromium were associated with significant lessening of growth at 12 and 8 of 16 intervals, respectively. Survival of gallium-fed females at older ages was less than that of controls, whereas survival of palladium-fed males and yttrium-fed mice of both sexes were greater. Tumors were found at necropsy in 16.3% of one group of controls, 27.4% of the scandium, 26.0% of the gallium, 13.0% of the indium, 28.8% of the rhodium and 29.2% of the palladium groups. Malignant tumors were increased in rhodium and palladium groups, at a minimally significant level of confidence ( $P < 0.05$ ), all but one tumor being malignant. In a second series, tumors were (over)

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0.8  
MICROWAVE OVENS AND THEIR PUBLIC HEALTH SIGNIFICANCE

Elder, Robert L., and Walter E. Gundaker (Public Health Service, Bureau of Radiological Health, Rockville, Md. 20852)

Journal of Milk and Food Technology 34, No. 9, 444-446 (September 1971)

Recent field surveys reveal that proper maintenance on the part of the owner or operator and improved servicing are important in controlling microwave oven leakage. The Department of Health, Education, and Welfare's performance standard for microwave ovens will apply to ovens manufactured after October 6, 1971, but this standard cannot be truly effective unless the ovens are conscientiously maintained after purchase. [9 references]

FTP

The sources of condensation formation in a meat factory and the amount of humidity formed are discussed. Methods for the prevention of condensation formation are reviewed. C.S.B.

Reprinted

BFWIRA Abstracts 24, Supplement, Abstract No. 2518, 520 (July/August 1971)

0.8  
THE PROBLEM OF CONDENSATION IN MEAT INDUSTRY PLANTS

Stepanov, L. J.

Meat Ind. Rev., Yugoslavia 2, No. 5, 15-17 (1970) (In Serbo-Croat, English summary)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 1 PAGE 5







Wood, Garnett, and Lane Hintz (Division of Food Chemistry and Technology, Food and Drug Administration, Washington, D.C. 20204)  
Journal of the Association of Official Analytical Chemists 54, No. 5, 1019-1023 (September 1971)

This article describes some of the chemical alterations that occur in the lipids of rockfish (striped bass, *Roccus species*) tissue during storage for 16 days at the temperature of melting ice. The fish tissue was homogenized and placed in glass jars; the jars were stored in crushed ice. The lipids were extracted from the fish samples at storage intervals of 0, 6, 10, and 16 days. In the fresh (0-day tissue), the phospholipid fraction of the lipids contained the highest proportion of polyunsaturated acids, and the neutral lipid fraction contained the highest proportion of monounsaturated acids. As storage of the fish tissue progressed, weights of total phospholipids and neutral lipids decreased and weights of free fatty acids increased in almost equivalent amount. The polyunsaturated acids, eicosapentaenoic (C20:5) and docosahexaenoic (C22:6), were affected more than were the other acids present and were lost at a faster rate from phospholipids than from neutral lipids. Most of the loss of polyunsaturated acids was from the cephalin fraction, even though it contained only about 1/4 of the total polyunsaturated acids. Relatively small amounts of the polyunsaturated acids were lost from the neutral lipids and virtually none from the lecithin. [1 figure, 5 tables, 20 references]

Ingram, M., et al.  
Journal of Applied Bacteriology 34, No. 1, 1-213 (March 1971)

Among the 15 papers constituting this symposium are the following:

"Microbial Changes in Foods--General Considerations," by M. Ingram (Agricultural Research Council, Meat Research Institute, Langford, Bristol BS18 7DY, England), pp. 1-8. [28 references]

"Changes Caused by Microbes in Spoilage of Meats," by M. Ingram and R. H. Dainty (Agricultural Research Council, Meat Research Institute), pp. 21-39. [113 references]

"Bacteria Active in the Spoilage of Certain Sea Foods," by R. A. Herbert, Margaret S. Hendrie, D. M. Gibson, and J. M. Shewan (Torry Research Station, Ministry of Technology, 135 Abbey Road, Aberdeen AB9 8DG, Scotland), pp. 41-50. The authors' purpose was to study in greater depth the nature and amount of the volatile sulfur compounds in fresh and spoiling cod stored at 1° or 2° C., the types of bacteria causing the spoilage, and the substrates in cod muscle that are subject to bacterial attack. The sulfide-producing strains of bacteria attack cysteine, methionine and possibly glutathione, producing H<sub>2</sub>S, (CH<sub>3</sub>)<sub>2</sub>S, and CH<sub>3</sub>SH either alone or in combination. The activities of some groups of gram-negative bacteria cause spoilage in certain seafoods. The off-odors and -flavors that characterize spoiling cod and haddock were reproduced by inoculating blocks of sterile cod muscle with *Pseudomonas* spp., including *P. putida*, *P. fragi*, and *P. putrefaciens*. Although the number of these spoilage types increases considerably (over)

Burgess, John  
Fishing News No. 3036, 9-10 (August 27, 1971)

In the previous article, the author described the traps made by 11 United Kingdom and 1 Norwegian manufacturers. In the present article, he repeats these addresses and adds descriptions of some dozen more traps, pots, and creels, giving the address of the manufacturer. Features of some of these pots follow.

1. A hemispherical plastic trap 10.5 in. high with a 24-in.-diameter, plastic covered-metal base. Since the upper part can be detached from the base, several uppers and bases can be stacked together in a small space--the manufacturers say the parts for 200 pots can be carried in a standard lobster boat. They also say that the trap's light weight and the position of its tow eye make it easy to haul; that its broad, metal-ballasted base gives it maximum stability in a ground swell; that the central position of the built-in bait cup will attract shellfish from all directions, and the bait cup itself means that rebaiting is not required as often as would otherwise be necessary; that the flexible entrance allows larger lobsters to enter; and that easy access to the interior permits quick removal of the catch and rebaiting, if necessary.

2. A round pot (13 in. high and 22 in. in diameter) and a creel-shaped pot (13 by 18 by 22 in.) made of galvanized steel rod (the latter with a wooden base). Both these pots have a woven-cane top entrance that comes in any size required; a large door hinged to the base and held in place by a strong rubber band, thus permitting easy extraction of large crabs; and a quick-baiting device that operates with the pull of a string--pull the string and the old bait drops out, let it go (over)

Anonymous  
Western Fisheries 82, No. 5, 12-22 ff. (August 1971)

The Arctic Harvester, which was launched in mid-July, has been called the most automated fish boat possible with present knowledge. She is 116 ft. overall, 107 ft. at the waterline, and has a 30 ft. 6 in. beam and a 15 ft. 3 in. molded depth. The burden of her \$1,200,000 cost was somewhat eased by a 35% federal fish boat subsidy and a 4% long-term loan for about half the cost from the government of New Brunswick.

The vessel has all the diverse equipment and design features necessary to fish for herring, capelin, mackerel, or tuna--in the Arctic or the tropics. Her greater-than-average beam and very high prismatic coefficient make possible her very stable fishing platform. Yet she can turn in an extremely short distance going astern and in almost her own length going at speed. Her hull was carefully treated to resist corrosion for many years, being sandblasted, coated with hot galvanized zinc, and painted with epoxy coatings. She can carry 400 tons of her-ring or 300 tons of frozen tuna plus her 18,000 gal. of fuel and 5,000 gal. of fresh water.

Her locomotive engine develops 975 hp. at 900 r.p.m., 22,000 lb. of thrust during trawling, and an average 12.25 knots. The cylinder units are assembled into "powerpacks" that are readily interchanged at sea. Because of the sound- and vibration-damped bulkheads, the roar of the engine is only a faint whisper in all areas outside the engine room. In addition to this noise control, the crew's quarters are completely air conditioned, thermally insulated, and electrically heated. The engine room itself has been called a plumber's masterpiece--it (over)



2.01 (0.6)

during chill storage, they never account for more than 10 or 20% of the total flora. The contribution of the remaining 80 or 90% to the spoilage pattern was not investigated. [2 figures, 2 tables, 48 references]

"Microbiology and Chemical Changes in Raw Hams of Italian Type," by G. Giolitti, C. A. Cantoni, Maria A Bianchi, and P. Renon (Istituto di Ispezione degli Alimenti 'P. Stazzi,' University of Milan, Via Celoria 10, Milan, Italy), pp. 51-61. [10 tables, 18 references]

"Physiological and Metabolic Attributes of Microbial Groups Associated With Foods," by D. A. A. Mossel (Central Institute for Nutrition and Food Research TNO Zeist, The Netherlands), pp. 95-118. [5 tables, ~200 references]

"Application of Microbial Proteases to Soybean and Other Materials To Improve Acceptability, Especially Through the Formation of Plastin," by M. Fujimaki, H. Kato, S. Arai, and M. Yamashita (Department of Agricultural Chemistry, University of Tokyo, Tokyo, Japan), pp. 119-131. [8 figures, 6 tables, 26 references]

"Relationship of Microbial Activity to Changes in Lipids of Foods," by J. A. Alford, J. L. Smith, and H. D. Lilly (Meat Lab., Eastern Utilization Research and Development Div., Agricultural Research Service, USDA, Beltsville, Md. 20705), pp. 133-146. [6 figures, 6 tables, 49 references]

"Production of H<sub>2</sub>S by Yeasts: Role of Nutrients," by T. Wainwright (A. Guinness Son & Co., (Dublin) Ltd., St. James's Gate, Dublin 8, Eire), pp. 161-171. [2 figures, 4 tables, 52 references]

"Factors Affecting the Production of Bacterial Food Poisoning Toxins," by A. C. Baird-Parker (Unilever Research Lab., Colworth/Welwyn, Colworth House, Sharnbrook, Bedford, England), pp. 181-197. [~125 references]

"Factors Affecting the Production of Mycotoxins," by B. Jarvis (National College of Food Technology, University of Reading, St. George's Avenue, Weybridge, Surrey, England), pp. 199-213. [4 figures, 4 tables, ~90 references] LB

2.01 QUANTITATIVE AND QUALITATIVE CHANGES OF MICROFLORA  
(1.51) IN A SKIN SLIME OF COD-FISH STORED IN A STERILE ICE

Zaleski, Stanisław, Stanisław Jara, and Krystyna Sobolewska-Ceronik (Department of Fish Microbiology, Wyższa Szkoła Rolnicza, Szczecin, ul. Kazimierza Królewicza 4, Poland)

Zeszyty Naukowe 31, Acta Ichthyologica et Piscatoria I, 127-135 (1970)

Cod (*Gadus morrhua* L.) caught in the Baltic Sea between February and July were taken from the trawl, iced, and stored under rigorously sterile conditions. As the ice melted, it was replaced (every second day); meanwhile, the fish were prevented from coming in contact with the melt water by a partition-plate across the holding-tank bottom. Quantitative and qualitative records of the bacteria in the slime were taken every 2 days for 12 days.

After 2 days' storage, the slime on the fish's skin contained from 3,400 to 21,700 bacteria/cm.<sup>2</sup>, the average being 10,930. The number increased progressively throughout the storage period until at the end of 12 days the average number of bacteria was 18,240,000/cm.<sup>2</sup>. Gram-negative bacteria increased from an average of 4,500/cm.<sup>2</sup> (38.5% of the total) on the second day of storage to 14,585,000/cm.<sup>2</sup> (78.8% of the total) on the twelfth day; gram-positive bacteria, from 6,430/cm.<sup>2</sup> to 3,655,000/cm.<sup>2</sup>. After 2 days' storage, the gram-negative microflora consisted mainly of *Pseudomonas* (43.1%), *Achromobacter* (31.5%), and *Flavobacterium* (17%). The remaining 8.4% consisted mainly of *Alcaligenes*, *Xanthomonas*, *Aeromonas*, and *Enterobacter*. At the end of the twelfth day, *Pseudomonas* constituted 70.2% of the total; *Achromobacter*, 20.9%; and *Flavobacterium*, 7.0%. The quantity of *Pseudomonas fluorescens* fluctuated within the range of 18-29%.

[2 figures, 17 references]

LB

2.117

even contains a system whereby the engineer can reverse the flow of the refrigerating brine to backflush scales and other waste from the fish tanks. The parallel chilled brine system can circulate in any direction in all or any one of the fish tanks. The tanks themselves are coated with FDA-approved epoxy. All the water, oil, air, and electrical services were preassembled and preconnected at the manufacturer's plant, thus saving about 1 month's work for 10 men at the shipyard.

The ship can be controlled from three positions: the central wheelhouse, or either the port or starboard bridge wing. The control stations on the two bridges are necessary because two seines are carried at all times, ready to fish instantly. A 15-fathom seine is used for conventional fishing. The seine winch is designed for fishing on either side, and the ring trough, davits, fairleads, and other gear along the rail are duplicated accordingly. One of the fish pumps used during gear ring fishing is hooked into a descaler; the fishes' scales are removed (and salvaged for later sale to Vitamin K producers) as the fish pass into the hold.

During tuna fishing, the descaler is removed and three high-speed, outboard-powered, herding boats are stored in its place. The seine skiff is a 26-ft. aluminum boat powered by a 240 b.hp. diesel. It is completely decked in, having its own wheelhouse, a herring recorder, and a ship-to-ship radiophone. Its triple keels fit into matching grooves on the stern ramp of the Arctic Harvester; thus it can be drawn up during heavy seas in complete safety.

Much of the Arctic Harvester's essential electronic gear is duplicated: the radar set, the herring recorder, and the sonar. She also has an automatic radio direction finder, a loran, an AM radiophone and a single-sideband phone, several citizen band phones, and a navigator that will provide a fix in less than 1 min. Her minor equipment includes an intercom, a fish flasher, a water thermometer, and a rudder-angle indicator. [7 photographs] LB

2.1128

and the new bait drops into position. The round pot is unusual in that polythene netting covers the inside, not the outside.

3. Two 14- by 20- by 27-in. creels made of welded polythene tubing, having a beech or elm base, and weighing 10 lb. without ballast. One has two entrances, both made of the same sized netting as covers the pot, and a door at one end for removing the catch and baiting. The other, a parlor type, has only one entrance from the outside. A wide, black polythene funnel leads from the reception compartment into the parlor, and a door at the parlor end folds back to permit removal of the catch. Both creels are highly resistant to weather and weight damage; a person can stand on them, depressing the bows till they touch the base, but as soon as he gets off, they begin to recover their shape, only a slight slackening of the netting and bait cords revealing the rough treatment.

4. A circular, nylon-coated steel pot designed to stay put in waters where tides are strong. The concrete base is set in half a rubber tire, the resilience of which militates against the pot's getting stuck among rocks. The pot weighs about 35 lb., but if particular conditions require, more or less concrete can be poured to alter its weight. The entrance, hinged and tapered, is at the top, which is held down by a toggle and so can be quickly and easily released for removing the catch and rebaiting.

5. A six-sided pot made entirely of plastic and having a funnel-shaped, polythene top entrance 10 in. wide at the larger end. A Scottish lobster fisherman who bought 150 of these pots about 9 months ago and added 50 more in the spring, has promised to report on their fishing effectiveness after he has worked them for 12 months. [5 figures]

LB



2.15 BIOLOGIST AND LOBSTERMAN DEVISE SYSTEM  
(1.87) TO BRING HAUL BACK ALIVE

Anonymous  
National Fisherman 52, No. 7, 12A (November 1971)

Offshore lobster fishermen must keep their catch on board for days, or even weeks, before they can get it to storage tanks on shore. Losses average about 20%. With the system reported here, the designers have reduced their losses to less than 2.5%. Instead of flooding the hold and continually pumping sea water in, or holding the catch in deck tanks awash with running sea water, they aerate the water. Use of the same water throughout the trip eliminates the need for large pumps and sea valves, and makes movement of tons of water unnecessary.

Lobsters are kept in 48- by 32- by 34-in. plywood tanks in the fish hold, the tanks being filled with sea water on the way to the fishing ground. Each tank will hold 600 lb. of lobster. Since the hold is insulated and refrigerated with standard refrigerator plates, the temperature of the water in the tanks has reached about 42° F., the temperature maintained in the hold, by the time the lobsters are caught. Before being put in the fishhold tanks, the lobsters are acclimated in tanks on deck. This period allows the lobsters to get rid of sand and silt and the crew to cull the weak and injured and band (with rubber bands) the claws of the rest.

For aeration, a large volume of air (18 c.f.m.) is pumped at low pressure (8 lb.) through a 1½-in. plastic main line and three ¾-in. flexible plastic lateral lines to 20-in. lengths of 1½-in. PVC pipe located near the bottom of the tank in three of the vertical corners, and on the bottom at the center of each side. With in each pipe are air stones (made of porous, cinderlike material) that break the (over)

2.3 FISHPLANT SANITATION AND CLEANING PROCEDURES

(3.18)  
Doyle, John P. (Fisheries Extension Program, Division of Statewide Services, University of Alaska, College, Alaska)  
University of Alaska Sea Grant Marine Advisory Bulletin No. 1, 10 pp. (n.d.)

Sections of the report are as follows:

- Introduction
- Employee Attitudes
- Detergents
- Sanitizing or Sterilizing Agents
  - Chlorine compounds
  - The germicidal effect of chlorine
  - The advantage of chlorine gas
  - Hypochlorites
- Instructions to clean-up crews
  - Suggested Periodic Cleaning Schedule
  - Personal Hygiene

The report ends on this note of caution: "The above outlined procedures will cost in equipment and labor but can result in an overall economy of operation. Manpower is the most expensive element involved. A small crew trained to do the job will be much more economically efficient than the present system of everyone 'pitching in' and giving a hand. You will also have a cleaner plant, improved product and better working climate for all concerned."

LB

2.3 FISH PROCESSING

Jobmann, P.; Nordischer Maschinenbau Rud. (pat.)  
Canadian Patent 868,654  
Food Technology 25, No. 9, 64 (September 1971)

The patent covers an apparatus for skinning fish fillets.

FTP

Reprinted

This article is based on the first section of a booklet called 'Clean in Place' by the same authors and published by the Cherry-Burrell Corporation in the U.S.A. The selection of the proper cleaning compounds for different circumstances is discussed. A flow diagram is used to illustrate typical CIP (Clean-in-place) techniques for a cannery, and the cleaning of various pieces of cannery equipment is described. L.P.

REPRINTED FROM ABSTRACTS 24, No. 6, Abstract No. 1823, 378 (June 1971)

Carlson, V. R., and G. A. Gould

Canner/Packer 139, No. 13, 18-21 (1970)

(3.336)

TIPS ON CIP-ING PROCESSING EQUIPMENT

0.6

ARSBERETNING FRA FISKERIMINISTERIETS FORSKNINGSLABORATORIUM FOR 1970  
[ANNUAL REPORT OF THE TECHNOLOGICAL LABORATORY OF THE DANISH  
(9.4)(2.40) MINISTRY OF FISHERIES TO THE DANISH FISHING INDUSTRY, 1970]  
(6.132)(1.0142)

Anonymous

Fiskeriministeriets Forsøgslaboratorium, København, 53 pp. (1971)

1. Contents of the report to the industry (in Danish), pp. 5-45.

Introduction (loss of protein and oil; poisoning dangers and odor nuisances; chilling in industrial fish boats; the importance of the quality of the raw product in fishmeal production; further improvement in the fish industry)

Experimental Work

Industrial Fish

I. Loss in protein and oil of industrial herring during storage (weight loss during storage at 0°, +6°, +12° C.; oil and protein loss)

II. Odor components in spoiled industrial fish (storage research; inspection of fish cargoes)

III. Cooling of industrial fish on board (catching; icing; chilling; insulating; draining; losses during unloading of chilled and nonchilled industrial fish quality of chilled and nonchilled industrial fish)

IV. Influence of the quality of the raw product on the fishmeal product (heat coagulation of fish proteins; laboratory inspection)

Fresh Consumer Fish (sand eel and capelin products for the consumer; handling the catch on board; mechanical cleaning)

Advising and Collaborating With Industry, Authorities, and Institutions (frozen raw products for filleting; canned shrimp; frozen shrimp)

Training (drying of haddock and cod fillets; spoiling of salmon)



0.6 (9.4)(2.40)(6.132)(1.0142)

Also the usual reports of visitors, addresses given, publications, attendance at symposia and conferences, assistance, to business laboratories, and personnel. [15 figures, 7 tables, 7 references]

2. Experimental Work -- Industrial Fish (in English), pp. 46-53.

In 1969, a great part of the Laboratory's efforts was spent investigating the handling and storing of raw fish before it is processed into fish meal. The report for that year contained results obtained on air pollution and health hazards involved in stowing on board, unloading, and processing industrial fish. Results obtained in 1970 confirmed that chilling to around 0° C. greatly reduces the bacterial breakdown of the fish and the emission of carbon dioxide, hydrogen sulfide, ammonia, and volatile amines. Although such emissions represent a loss of protein, far more protein is lost through the loss of blood water and oil. During unloading, up to 40% of the oil and protein matter may be lost through the blood water. This loss must be added to the continuous loss that occurs during stowage on board.

This second part of the report is concerned with oil and protein losses that occur during quiet storage in the laboratory. However, most of this part consists of extracts from a paper read by Torben Ettrup Petersen (not on the Laboratory staff) at the meeting of the Scientific Committee of the International Association of Fish Meal Manufacturers held in Copenhagen in April 1971. In that paper, the author confirms the extremely great influence of temperature on the loss of raw materials during storage and transport of the fish to the industrial plant. He concludes that although chilling won't eliminate the losses, it will reduce them. Addition of preservatives during storage has little effect on the weight loss, for the breakdown of fish proteins is due mainly to proteolytic enzymes and only to a smaller extent to bacteria. [2 tables, 5 references] LB

2.9 SOME CHEMICAL AND PHYSICAL PROPERTIES OF TWO TOXINS FROM THE RED-TIDE ORGANISM, GYMNODINIUM BREVE

Martin, Dean F. (Department of Chemistry and Marine Science Institute, University of South Florida, Tampa, Fla. 33620), and Ashim B. Chatterjee Fishery Bulletin 68, No. 3, 433-443 (June 1971) (National Marine Fisheries Service NOAA, U.S. Department of Commerce, Washington, D.C. 20235)

A procedure is given for isolating and purifying two toxins (substance I and II) from cultures or blooms of *Gymnodinium breve*. In vitro studies of acetylcholinesterase activity show that the major toxin is not a cholinesterase inhibitor. On the basis of the infrared data the properties of toxin samples isolated from blooms of *G. breve* appear to be identical to those from axenic cultures.

Substance II is a light yellow, low-melting solid. Carbon, hydrogen, and phosphorus are present; sulfur, chlorine, bromine, and nitrogen are absent. The percentage composition is given for carbon, hydrogen, oxygen, and phosphorus; an empirical formula of C<sub>9</sub>H<sub>11</sub>O<sub>2</sub>NP is indicated by the analytical data. A molecular weight of 650 was obtained from a sample of substance II.

Substance II was characterized by the absorption spectra (ultraviolet, infrared), by the nuclear magnetic resonance spectrum, and by the specific optical activity. These observations and the mass spectrogram provide useful structural information.

Substance I was characterized by the infrared spectrum which indicated the presence of a carbonyl group. Not enough of substance I was isolated for an elemental analysis. [4 figures, 7 tables, 26 references] Authors' abstract

2.3 FISH FILLET SKINNING MACHINE (MACHINE ZUM ENTHÄUTEN VON FISCHFILLET)

Eichler, J. (pat.) West German Patent Application 1,554,690 (1969) (In German) Food Science and Technology Abstracts 3, No. 3, 3R128, 504 (March 1971)

Fish are placed on a conveyor belt that has fillet-shaped recesses and a perforated base. As the belt passes across evacuated chambers, the skin against the perforated base is held firmly in place by suction while a cutting device removes the meat from the skin. The device is particularly good for fish fillets that have been steeped in brine or vinegar solutions, for they can be skinned mechanically without loss of meat.

Extractor: LB

2.3 DEVICE FOR SKINNING FISH FILLETS (VORRICHTUNG ZUM ENTHÄUTEN VON FISCHFILLETS)

Michael, J. (Nordischer Maschinenbau Rudolf Baader) (pat.) West German Patent Application 1,454,077 (1969) Food Science and Technology Abstracts 3, No. 3, 3R102, 501 (March 1971)

This device facilitates the skinning, without damage, of small fillets having thin skins. It consists of a skinning roller and a clamping roller that rotate in opposite directions, and a skinning knife that is actuated by a fillet sensor. Throughout the cutting operation, a magnet holds the knife in an operating position.

Extractor: LB

2.3 IODOPHORS IN FOOD AND BEVERAGE MANUFACTURE

Davis, J. G. Food Manufacture 46, No. 8, 39, 43, 45, 47 (August 1971)

An iodophor is a complex of iodine and a nonionic surface-active agent that releases iodine in water. Iodophors are particularly suitable for sanitizing food manufacturing equipment where mineral salts, such as calcium scale, are a problem; where penetration of a sanitizing agent is difficult; and where food poisoning organisms are likely to be found. A typical iodophor formulation contains (in parts by weight of ingredient) iodophor A, 17.5; nonylphenoxy polyoxyethylene ethanol, 5.0; phosphoric acid (85%), 10; water, 67.5--the available iodine content is 1.75. [2 tables, 63 references] FTP

2.3 (28.1) 51.2

air flow onto small bubbles, lifting the bottom water from the tank and creating a vertical pump in the fourth corner of the tank pumps water from the bottom through a 1-in. flexible plastic hose to a galvanized-wire basket containing fiberglass filtering material. Thus the water is not only filtered before it drops back into the tank, it is also further enriched with oxygen.

The material for each tank costs about \$265 (\$200 for the air pump and \$65 for such associated equipment as air stones, plastic hose, and air valves. Additional information on parts lists, addresses, and costs is available from one of the designers (Jack Baker) at Baker's Lobster Shanty, Box 1312, Point Pleasant Beach, N.J. 07760. [5 figures]



3.15 INFLUENCE OF RADIATION ON SOME PHYSIOLOGICAL BACTERIAL GROUPS IN COLD STORED TROUT

Muenzner, R. (Bundesforschungsanstalt fuer Lebensmittelrischhaltung, Karlsruhe, Germany)  
Kaelteforsch.-Klim. 21, 328-330 (1969) (In German)  
Nuclear Science Abstracts 25, No. 11, 2434 (June 15, 1971)

Trout with four different degrees of bacterial contamination were packaged under vacuum and irradiated with 0.1 Mrad. Throughout cold storage of irradiated and nonirradiated fish, the germ count was determined at 4, 20, 29, and 37° C. incubation temperature. Gelatin-liquifying and casein-degrading germs were counted separately. Results showed that radiation treatment reduced predominantly proteolytic germs, while psychrotrophic germs were affected to a lesser degree.

(tr-auth)  
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The food is formed into slabs edged with paper; then the slabs are contact frozen.

FTP

3.2344 FREEZING APPARATUS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 52 PAGE 11

Spec. Alnoie Konstrukciorskoe Buro Technologicheskogo Oborudovaniya [Masnoj i Mocochoj Promyslennosti (pat.)]

German Patent 1,601,920

Food Technology 25, No. 7, 77-78 (July 1971)

51.6 INVESTIGATIONS CONCERNING THE INFLUENCE OF TEMPERATURE ON IRRADIATION LOSSES OF CYSTINE AND CYSTEINE IN FOODSTUFFS

Gruenewald, Th. (Bundesforschungsanstalt fuer Lebensmittelrischhaltung, Karlsruhe, Germany)  
Kaelteforsch.-Klim. 21, 336-338 (1969) (In German)  
Nuclear Science Abstracts 25, No. 11, 2434 (June 15, 1971)

Freeze-dried pork as well as fresh and freeze-dried beef, cystine and cysteine were determined polarographically. Five Mrad reduced the cysteine content, partially through transformation into cystine. In beef, conversely to poultry dried samples, cysteine loss could be prevented by irradiation at cryogenic temperatures.

(tr-auth)  
Reprinted

Pieces of food are frozen by mixing them with particles of carbon dioxide in a revolving tube that is positioned at a slope with respect to the horizontal.

FTP

3.2349 FREEZING PROCESS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 52 PAGE 11

Granata, A. J.; Thermice Corp. (pat.)

Canadian Patent 865,047

Food Technology 25, No. 7, 77 (July 1971)

Pieces of food are frozen by mixing them with particles of carbon dioxide in a revolving tube that is positioned at a slope with respect to the horizontal.

FTP

3.231

'ENGINEERING EXCELLENCE OR SOCIETAL REGULATION?' KEYNOTES 1971 ANNUAL MEETING [of the American Society of Heating, Refrigerating and Air-Conditioning Engineers]

Anonymous  
ASHRAE Journal 13, No. 7, 33-51 (July 1971)

Some 63 papers were presented at ASHRAE's 1971 Annual Meeting, held August 22-25 in Washington, D.C. Among them were the following:

- At the symposium on "Trends & Developments in Insulation for Food Processing & Storage Facilities" --
- "Selection & Installation of Refrigerated Doors," by R. Slopa (Butcher Boy Meat Saws & Grinders Co., Harvard, Ill.)
- "The Applications of Urethane Foams in Controlled Environmental Storage of Perishable Produce," by J. D. Pelesko (Urethane Foams, Reichold Chemical Co. Inc., Elizabeth, N.J.)
- "Insulation Trends & Developments," by J. Kuhn (U.S. Insulation Co. Inc., Chicago, Ill.)
- "New Solutions to Old Insulation Problems," by W. Lovett (Pittsburgh Corning Corp., Pittsburgh, Pa.)
- "The Use of Modular Insulation Panels in Refrigerated Building Construction," by H. G. Hiatt (Freezer Box Division, Annapolis Yacht Yard Inc., Annapolis, Md.)

At the symposium on "Refrigeration Systems for Perishable Food Delivery Vehicles" --

- "Plate/Blower-Coil Systems for Low Temperature Trucks," by W. E. Lauterbach (Dole Refrigerating Co., Chicago, Ill.)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 52 PAGE 11 (over)

3.2383 PACKAGING CONTAINER FOR MEAT PRODUCTS AND THE LIKE

Graveley, Oscar W. (assignor to Niagara Frontier Services, Buffalo, N.Y.) (pat.)  
U.S. Patent 3,575,287 (April 20, 1971)  
Modern Packaging 44, No. 8, 84 (August 1971)

The container includes a tray having a transparent bottom and a raised rim. In the rim is a channel, open to the bottom, where moisture-absorbing material is exposed at the juncture between the bottom wall and the rim to absorb juices.

Projections at the edge of traylike packages prevent the packages from wedging together when they are stacked. The projections are formed when a plastic film drawn into the package depresses sections between slots along the upper edge of the carton to make flaps.

LB

3.2383 PACKAGE COMPRISING AN OUTER CARTON BLANK AND A LINING AND PROVIDED WITH MEANS PREVENTING WEDGING

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 52 PAGE 11

Dilloc, Rolf Magnus (assignor to AB Akerlund & Rausing, Lund, Sweden) (pat.)  
U.S. Patent 3,575,338 (April 20, 1971)  
Modern Packaging 44, No. 8, 84 (August 1971)

Projections at the edge of traylike packages prevent the packages from wedging together when they are stacked. The projections are formed when a plastic film drawn into the package depresses sections between slots along the upper edge of the carton to make flaps.

LB







PREPARATION AND PACKING OF SMALL FISH

Ogorodnikov, L. S., P. A. Kuraptsev, N. A. Danilov, A. O. Khusid, B. A. Osipov, and V. V. Petukhov (Nauchno-issledovatel'skii i Konstruktorskii Institut Mekhanizatsii Rybnoi Promyshlennosti, U.S.S.R.) (pat.)  
U.S.S.R. Patent 269,449 (1970) (In Russian)  
Food Science and Technology Abstracts 3, No. 3, 3R123, 504 (March 1971)

This device consists of twin conveyors; a unit for spraying the fish with a smoking liquid; a heat-treatment chamber; and horizontal pushers attached to rotatable forks, which grip the fish as they enter the head section and transfer them to packing containers.

Extractor: LB

The canned product contains boiled fish, vegetables (optional), seasoned meat juice liquids, and paprika oil.

FTP

3.335

CANNED FISH PRODUCT

Ito Shokuhin K.K. (pat.)  
Japanese Patent 15657/71  
Food Technology 25, No. 10, 66 (October 1971)

THERMAL RESISTANCE OF *BACILLUS SUBTILIS* SPORES  
STUDIED IN THE MEAT EXTRACTS OF THE VARIOUS SEA  
AND FRESH-WATER FISHES

Zaleski, Stanisław, Edward Ceronik, and Krystyna Sobolewska-Ceronik (Department of Fish Microbiology, Wyższa Szkoła Rolnicza, Szczecin, ul. Kazimierza Królewicza 4, Poland)  
Zeszyty Naukowe 31, Acta Ichthyologica et Piscatoria 1, 137-144 (1970)

A number of authors over the past several decades have reported on the protective effect that proteins have on bacteria in a thermal environment--that is, the proteins' tendency to increase the resistance of the bacteria to heat. Several have pointed out that the bacteria's thermal resistance is governed by the kind of protein constituting the environment and that the "z" value changes with the medium. When the curve for the thermal death time, TDT, of an organism is plotted on semilog paper--i.e., temperature vs. time--the number of degrees Fahrenheit required for the curve to cross one logarithmic cycle is expressed as "z." The present authors investigated the effect of proteins extracted from four marine and four fresh-water fish on the TDT of *Bacillus subtilis* spores. Fat-free extracts of each fish were inoculated with  $9.0 \times 10^6$  ml. of a stock suspension of *B. subtilis* spores ( $10^6$  spores/ml. distilled water); heated for 0.25 to 0.50 min. at 101, 107, 113, 119, or 125°C.; and then cooled in running water; and then heated at 121°C. at which time the TDT was determined. The results are summarized in Table 1. The authors conclude that the proteins of the fish studied do not destroy the spores at 121°C. when the medium is supporting the organisms. Since the medium was fat free, their results support the conclusion that the proteins of the fish studied do not destroy the spores at 121°C. when the medium is supporting the organisms.

COMMERCIAL FISHERIES ABSTRACTS

3.60  
(0.32)

PROTEIN STRUCTURE AND FREEZE-DRYING: THE EFFECTS  
OF RESIDUAL MOISTURE AND GASES

Greiff, Donald (Department of Pathology, The Medical College of Wisconsin, Milwaukee, Wis. 53233)  
Cryobiology 8, No. 2, 145-152 (April 1971)

The final product obtained in the drying of biological materials by sublimation of ice in vacuo is a function of the chemical and physical nature of the macromolecules present, the kinds and amounts of water molecules and their relation to the types and kinds of macromolecules, the influence of water on the conformation of the macromolecules, the gaseous environment in which dried preparations are placed, and the physical principles regulating the process of freeze-drying.

[1 figure, 2 tables, 27 references]

FTP

[5 figures, 7 references]

This article describes some of the problems that have been encountered and resolved (to varying degrees) in recent years in the day-to-day control of freeze-dried biological products (plasma, serum, toxins, vaccines, and cultures of microorganisms).

Seligmann, Edward B., Jr., and Jane F. Farber (Laboratory of Control Activities, Division of Biologics Standards, National Institutes of Health, Bethesda, Md. 20014)  
Cryobiology 8, No. 2, 138-144 (April 1971) (Academic Press, Inc., 111 Fifth Avenue, New York, N.Y. 10003)

FREEZE DRYING AND RESIDUAL MOISTURE

STEROLS OF CRUSTACEA

Idler, D. R., and P. Wiseman (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
International Journal of Biochemistry 2, No. 7, 91-98 (February 1971) (Scientific Publishers Ltd., Bristol, England)

The composition of the sterols of 14 species of crustacea was determined. Cholesterol was the major component sterol in all species. It constituted 66 to 100% of the total sterol in the euphasid *Nyctiphanes norvegica*, in 4 species of the suborder Macrura, and in 1 species of the Brachyura *Geryon quinquevatus*. When desmosterol was present, it was the second principal sterol. Six other minor sterols were identified in certain species of the crustacea. No cholesterol was found in 5 species of crustacea searched for the sterol.

Species of the suborder Macrura showed higher average total lipid, unsaponifiable, and sterol contents than did species of the suborder Brachyura. The range of total sterol in species of suborder Macrura was 70-140 mg. per 100 g. wet weight of tissue and in species of the suborder Brachyura, 40-100 mg. per 100 g. wet weight.

[1 figure, 3 tables, 33 references]

Chemical Abstracts 74, No. 3, 10760q (January 18, 1971)

Idler, David R., P. Wiseman, and L. M. Safe (Halifax Lab., Fish. Res. Bd. Canada, Halifax, Nova Scotia)

NEW MARINE STEROL, 22-TRANS-24-NORCHOLESTA-5,22-DIEN-3 $\beta$ -OL  
(1.84)

COMMERCIAL FISHERIES ABSTRACTS



0.5 (3.337)

probably the proteins peculiar to the particular fish species; and since these extracts were the only variables in the investigation, any changes in "z" would point to the effect of the individual protein on the thermal resistance of the *Bacillus*. Results of the investigation are tabulated below.

Effect of fish proteins on thermal resistance of *B. subtilis*

Source of protein	"z" value °C.	"f" value min.
Marine fish		
Cod ( <i>Gadus morrhua calarias</i> )	6.7	0.00345
Norway haddock ( <i>Sebastes marinus</i> )	8.0	0.01290
Mackerel ( <i>Scomber scombrus</i> )	7.3	0.00920
Herring ( <i>Clupea harengus</i> )	6.7	0.00490
Fresh-water fish		
Tench ( <i>Tinca tinca</i> )	7.0	0.00567
Lavaret ( <i>Coregonus lavaretus</i> )	9.4	0.05120
Whitefish ( <i>Coregonus albus</i> )	6.0	0.00310
Pike ( <i>Esox lucius</i> )	7.4	0.01420

ready-to-serve foods. [1 figure, 12 references]

LB

4.13

## NEW DATA ON THE COMPOSITION OF FISH LIPIDS

Dominova, S. R. (Kalininogradskii Tekhnicheskii Inst. Rybnoi promyshlennosti i Khozyaistva, U.S.S.R.)  
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1970, No. 2, 115-118 (1970) (In Russian)  
Food Science and Technology Abstracts 3, No. 3, 3R88, 499 (March 1971)

Using literature data as her source, the author analyzed the composition of fish lipids. The aliphatic acids of fish lipids contain considerably higher quantities of unsaturated components--with four, five, and even six double bonds--than do the aliphatic acids of oils from vegetables or warm-blooded animals. Odd numbers of carbons (11 to 23) and double bonds in unusual positions appear in fish lipid acids C<sub>4</sub> to C<sub>26</sub>. Among the other compounds that appear are C<sub>3</sub> and C<sub>4</sub> polyalcohols; the ethers of glycerin and higher alcohols (stearyl and palmityl); from phosphatides, lecithin and cephalin; and, in the brain tissue, sphingomyelin. The content of all these ranges from 0.38 to 1.1%. In addition, sterols (cholesterol), coloring matter (carotenoids), hydrocarbons (pristane and squalene), and vitamins (A, D<sub>3</sub>, and E) are present in fish fat. [25 references]

Extractor: LB

Lang, Konrad (Germany)  
Chemical Abstracts 73, No. 15, 74217e (October 12, 1970)

(4.2) (4.9) (9.13)

## PHYSIOLOGICAL EFFECTS OF FISH OILS AND FATS

4.0

IDENTIFICATION OF 22-CIS-CHOLESTA-5A-22-DIEN-3B-OL AND  
OTHER SCALLOP STEROLS BY GAS-LIQUID CHROMATOGRAPHY AND  
MASS SPECTROMETRY

11.4

Idler, D. R., and P. Wiseman (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
Comparative Biochemistry and Physiology 38A, 581-590 (1971)

Sterols were extracted from the scallop *Placopecten magellanicus* (Gmelin) then were separated by preparative gas-liquid chromatography and identified by analytical gas-liquid chromatography and mass spectrometry. The 22-cis and 22-trans isomers of cholesta-5,22-dien-3B-ol were identified. The principal sterols were cholesterol, 24-methylenecholesterol, and brassicasterol; others included sitosterol and 28-isofucosterol. Probable presence of cholesterol in the cholesterol fraction and poriferasterol in the 24-methylenecholesterol fraction was indicated by mass spectrometry. Tentatively identified were 22:23-dihydrobrassicasterol, fucosterol, and a C<sub>30</sub>H<sub>50</sub>O sterol (all minor components).

PLF

[5 figures, 51 references]

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To determine the position of individual fatty acids within a triglyceride, hydrolysis by pancreatic lipase was carried out at 40° C., buffered at pH 8 by 1 M-phosphate solution and emulsified with PVA [polyvinyl alcohol?].

[6 figures, 3 tables, 25 references]

## 3.63 DRIED FISH PRODUCT

Nakamura, S. (pat.)

Japanese Patent 10899/71

Food Technology 25, No. 9, 66 (September 1971)

Fish are steeped in brine, then they are air dried.

FTP

This article is primarily a supplement to a recent review by the author "Freeze-Drying of Biological Materials: Some Physical and Engineering Aspects." In Current Trends in Cryobiology, A. U. Smith, ed., pp. 138-149, Plenum Press, New York (1970). The author briefly discusses the more significant components of a total system, from formulation of the preparation to be freeze-dried and the choice of containers, to prefreezing and the layout and control of the freeze-drying system. He also mentions some special systems.

[5 figures, 12 references]

PLF

## MACHINERY AND METHODS IN FREEZE-DRYING

0.9.3 (0.8)

Rowe, Terence W. G. (Edwards High Vacuum (Plant) Ltd., Manor Royal, Crawley, Sussex, United Kingdom)  
Cryobiology 8, No. 2, 153-172 (April 1971)



4.60

ANTIOXIDANTS

Samejima, H., K. Nakayama, and Y. Nagano; Kyowa Hakko Kogyo Kabushiki Kaisha (pat.)  
U.S. Patent 3,579,357  
Food Technology 25, No. 9, 77 (September 1971)

The antioxidants have the general formula of  
 $R-S-(CH_2)_n-NH_2$   
R = hydrogen atom or lower alkyl group  
n = 2 or 3.

FTP

ILL

With meat curing treatment by dehydration at least 10 days at 100°C to 120°C, the meat is cured and the color is improved.

(1761 repositio) 69 '01 No. 25, 585, 222  
Food Technology 25, No. 9, 77 (September 1971)

Encl. H., S. Okumura, and Y. Nagano  
U.S. Patent 3,585,222  
Food Technology 25, No. 9, 77 (September 1971)

FAT STAYS IV

29.4

5.7

CEROID IN THE PRODUCTS OF CONCEPTION OF NORMAL AND  
VITAMIN E-DEFICIENT RATS

(4.92)

Horowitz, I. (Department of Physiology, The Faculty of Medicine, University of Toronto, Toronto, Canada), and W. Stanley Hartroft (The Research Institute, The Hospital for Sick Children, Toronto, Ontario, Canada)  
Journal of Nutrition 101, No. 8, 959-965 (August 1971)

Some half a century ago, Evans et al. reported the effect of vitamin E deficiency on fetal resorption in rats. Since, then, numerous reports have related vitamin E deficiency to the formation of ceroid, and the presence of ceroid to the influence of estrogen and progesterone. (Biochemically, ceroid is the end product of a series of reactions that involve the lipid peroxidation of unsaturated fatty acids, along with the liberation--in the presence of oxygen--of peroxides and carbonyl radicals.) The present report surveys the relation of ceroid and vitamin E in pregnant rats and examines the possibility of ceroidogenesis' playing a pathogenic role in the resorption of rat fetuses.

Experimental animals (all female)		Experimental diets	
Group	Number and type		
1	20 virgin rats	- commercial stock ration	
2	20 weanling rats	- purified ration containing high levels of polyunsaturated fatty acids (30% stripped corn oil and 5% cod-liver oil) and supplemented with 0.01% $\alpha$ -tocopheryl acetate	
3	40 weanling rats	- same as 2, but with no $\alpha$ -tocopheryl acetate	
4	2 rats (unmated)	- commercial ration	

(over)

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6. (1.80)(9.19)

UTILIZATION AND DISPOSAL OF CRAB AND SHRIMP WASTES

Mendenhall, Vivian (Cooperative Extension Service, University of Alaska, College, Alaska)  
University of Alaska Sea Grant Marine Advisory Bulletin No. 2, iv + 41 (March 1971)

This survey of the use and disposal of crab and shrimp wastes is based on a review of both published reports and current research. The emphasis on byproduct development and waste treatment is designed to point toward new ways of attacking waste-disposal problems, as well as toward additional sources of income. Major sections of the report are the Shellfish Waste Problem in Alaska, By-Products, Waste Treatment, and Reducing the Waste Disposal Problem. The author's thesis is that, although a byproduct may not increase a processor's profits, it has a good chance of offsetting the costs of waste treatment and of reducing the treatment problem.

The usefulness of byproducts for reducing wastes varies. Although meal adsorbs all solid wastes, dirty water remains. Isolation of chitin and protein concentrates takes care of all wastes but minerals, a minor source of pollution; however, production of these byproducts requires the use of corrosive chemicals, which in turn must be removed from the waste water. Production of shredded meat products reduces BOD, and production of whole-shell products reduces the amount of solids discharged as waste.

The usefulness of byproducts as additional sources of income also varies. Crude waste meal and products from whole shell offer little promise of net capital return at this time. Although chitinous products have no present market value, a

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 1 PAGE 15

(over)

6.190

SUMMARY OF PAPERS PRESENTED AT THE 1971 MEETING  
OF THE POULTRY SCIENCE ASSN.

Couch, J. R. (Department of Poultry Science, Texas A&M University, College Station, Tex. 77840)  
Feedstuffs 43, No. 41, 37-38, 45 (October 2, 1971); and No. 42, 31-32, 49 (October 9, 1971)

The 99 papers presented at the subject meeting dealt with (1) laying hen and broiler nutrition; and (2) turkey nutrition, molds and toxins, and pesticides. Among the subjects covered in the reviewer's summaries are the following.

Calcium. Researchers from the University of Tennessee reported the effect of dietary calcium and phosphorus on the bone density index, bone breaking strength, egg production, and egg specific gravity in laying hens; those from the University of Georgia, the somewhat better eggshell quality resulting from use of oyster shell rather than finely ground calcium carbonate as the calcium source.

Canadian herring meal. Washington State University researchers reported that Canadian herring meals fed to breeding hens depress hatchability.

Protein, amino acids, and ingredient evaluations. Tests conducted at the Canadian Department of Agricultural Research Station, Kentville, Nova Scotia, showed that broilers fed crab meal at the 10% level gain more weight than do those fed at the 0 or the 20% level; at none of the three levels will the meat taste fishy. Utah State University researchers reported that herring meal, meat-and-bone meal, and turkey-offal fed at a level to provide 6% of the protein can all be used satisfactorily as supplements in broiler diets--but the last two only if the amino acids are equilibrated.

Unidentified growth factors. Researchers at Louisiana State University observed significant growth responses in broiler chicks fed menhaden, anchovy, and

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(over)



Scheduled examinations revealed that some ceroid had formed in various parts of the placenta and the fetuses of all the rats. More ceroid deposits appeared in the fetuses and the animals of group 2 than in those of group 1; the largest deposits appeared at the resorption sites in group 3. These findings, the authors suggest, indicate--but do not establish--that ceroid deposition in placenta and fetuses is a cardinal pathogenic event in the fetal resorption that attends vitamin E deficiency.

Figures, 1 table, 13 references

LB

Reprinted

[10 references]

Even numbered, unsaturated fatty acids of the palmitoleate series can be converted to 20:4(n-7), an isomer of arachidonic acid. However, the extent of conversion is much less than that of oleate to 20:3(n-9), which is the chief substrate for arachidonate in essential fatty acid deficient rats. These results emphasize that the similarity in the location of the first three double bonds in the C-20 structure of arachidonate and 20:3(n-9) is a more important structural consideration than is the presence of a C-20 acid with four double bonds, each one carbon removed from the structure of arachidonate.

Anonymous Nutrition Reviews 29, No. 9, 213-215 (September 1971)

4.91 METABOLISM OF FATTY ACIDS OF THE PALMITOLEATE SERIES IN THE FAT-DEFICIENT RAT

STALVIA MATTI OF NOTION PROTECT

08-7

(pat.) (pat.) International to CPC assignor to The Procter & Gamble Co., Cincinnati, Ohio (pat.) U.S. Patent 3,592,661 Official Gazette of the U.S. Patent Office 888, No. 2, 540 (July 13, 1971)

Margarine oils comprising a soft oil component and an intermediate melting, randomly esterified, triglyceride component of high C12 content and low C16-18 content exhibit improved solids content properties as shown by a bent and rapidly sloping SCI curve.

FTL

Reprinted in part

4.81

MARGARINE OILS CONTAINING INTERMEDIATE MELTING RANDOMLY ESTERIFIED TRIGLYCERIDES OF HIGH C12 CONTENT

Seiden, Paul (Cincinnati, Ohio); assignor to The Procter & Gamble Co., Cincinnati, Ohio (pat.) U.S. Patent 3,592,661 Official Gazette of the U.S. Patent Office 888, No. 2, 540 (July 13, 1971)

Margarine oils comprising a soft oil component and an intermediate melting, randomly esterified, triglyceride component of high C12 content and low C16-18 content exhibit improved solids content properties as shown by a bent and rapidly sloping SCI curve.

Reprinted in part

6.190 (6.82)(9.19)

sardine meal; a commercial UGF concentration; and a liquid Streptomyces fermentation residue for the first 4 weeks of age. Less response was noted in chicks fed a dried fish-soluble product and poultry-byproduct meal. Researchers at Texas A&M University fractionated, isolated, and purified the UGF in distillers dried solubles. Two fractions were found, one soluble in isopropyl alcohol. The isopropyl-soluble fraction, which has also been isolated from condensed fish solubles, has the empirical formula  $C_{16}H_{29}O_5$  and may be a dicarboxylic acid.

Unidentified growth factors and antibiotics. Researchers at Virginia Polytechnic Institute and at Virginia State University reported that fish meal fed at a level of 5% increases body weights of turkey poulters 5.8% and feed efficiency 4.3%. The conclusion from these and other tests is that UGF sources increase the average weight of growing turkeys up to 8 weeks of age, that adding fat up to a level of 8% improves feed conversion, and that bacitracin and erythromycin thio-cyanate produce an antibiotic growth response (the higher level of added fat requires addition of 0.05 or 0.10% methionine for maximum performance). Researchers at Virginia State also found that adding fish meal at the 6 and 12% level increases egg production and hatchability of fertile eggs in Beltsville turkey hens.

Fishy flavor in turkeys. According to a report from the Campbell Soup Co., feeding more than 5% fish meal to turkeys just before slaughter has a detrimental effect on the flavor of the precooked, sliced and frozen meat; including vitamin E (22 I.U./kg.) in the diet reduces the severity of the off-flavor.

Pesticides. Several reports dealt with the effects of DDT, DDE, dieldrin, and parathion on growing chickens. Texas A&M researchers reported that feeding choline chloride and inositol to heptachlor- and DDT-treated Japanese quail caused a rapid disappearance of the pesticide residues from the birds' tissues. Oregon State researchers found that DDE up to 100 p.p.m. had no effect on egg production or eggshell thickness except when the calcium level was suboptimal.

(61.80)(9)(1)

few deserve further development and sales research--for example, as sewage flocculent. Researchers at the University of Washington are investigating potential uses of both chitosan (as a paper additive) and chitin. They have found that when chitin is chemically combined with a pesticide and applied to plants, the compound breaks down slowly, releasing the active pesticide at a controlled rate over a long period of time. Should this application prove successful, the amounts of pesticides required for agricultural crops could be greatly reduced and pesticides with fewer side effects could be used.

Evidently the production of all meat products leaves some waste residue--even production of byproducts that seem most economically promising leaves either solids or chemicals, or both, requiring disposal. Thus some waste treatment is always necessary. However, relatively simple modifications of the meat-production process itself could make waste treatment easier and more economical: reducing the amount of waste that must be disposed of by close attention to processing practices; converting part of the wastes to a salable byproduct; instituting procedures that keep pillage and discard to a minimum; cleaning and sanitizing with the smallest quantities of chemicals needed to do a thorough job; keeping the wastes as concentrated as possible to reduce the volume of material that must be treated.

The most economical solution to the waste problem of shellfish processors probably involves more than one of these approaches. However, the author warns, acceptance or rejection of any approach without adequate study could result in a greater expense than necessary and in failure to solve the waste problem. With proper planning and the help of a sanitary engineer who knows the geographic area and the industry, the problem can be simplified.

[9 tables, 189 references]

LB



6.30  
(1.0112)

SURVEY OF MACROPHYTE RESOURCES IN THE COASTAL WATERS OF ALASKA

McRoy, C. Peter, John J. Goering, Michael T. Gottschalk, Mary Mueller, and Sam Stoker (Institute of Marine Science, University of Alaska, College, Alaska 99701)

Sea Grant Program Report No. R71-6, 40 pp. (May 1971)

"The objectives of this project include the quantitative assessment of natural stocks of marine macrophytes (seaweeds and seagrasses) in the coastal waters of Alaska, the determination of the commercial value of macrophyte species from data on abundance and chemical composition, the collection and preparation of a reference herbarium of marine macrophytes, and the compilation of data from the literature on the chemical composition of Alaska marine macrophytes. ...

"We anticipate that the significance of this research will be that it provides the background for the development of a new industry in Alaska. We have received letters from several firms indicating an interest in our project. One firm has plans to open an office in Juneau and to work cooperatively with natives.

"As a result of an early survey Alaska is known to have sufficient stocks of brown seaweeds to support industry, the red seaweed stocks remain unknown (Chapman 1970)."

Attached to the report are reprints of three related articles published by the senior author:

"Standing Stocks and Other Features of Eelgrass (*Zostera marina*) Populations on the Coast of Alaska," Journal of the Fisheries Research Board of Canada 27, No. 10, 1811-1821 (October 1970). [8 figures, 2 tables, 30 references]

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6.32

RICERCHE SULLE POSSIBILITÀ DI SFRUTTAMENTO ECONOMICO DELLE  
ALGHE DELL'ALTO ADRIATICO. VI. SULLA COMPOSIZIONE CHIMICA E  
SULLA VARIABILITÀ STAGIONALE DEI POLISACCARIDI  
DELL' HYPNEA MUSCIFORMIS

(POSSIBILITY OF THE ECONOMIC USE OF THE ALGAE OF THE NORTHERN  
ADRIATIC. VI. THE CHEMICAL COMPOSITION AND SEASONAL  
VARIABILITY OF POLYSACCHARIDES IN HYPNEA MUSCIFORMIS)

Davanzo, S., G. Bruni, L. Coassin, Lokar, and C. De Goracuchi (Istituto di Mercologia dell' Università degli Studi di Trieste, Italia)  
Archivio di Oceanografia e Limnologia 16, No. 3, 197-213 (1970) (In Italian; English abstract and summary) (Consiglio Nazionale delle Ricerche, Istituto di Biologia del Mare, Riva Sette Martiri, Castello 1364/A, Venezia, Italia)

Three polysaccharides isolated from the red alga *Hypnea musciformis* were characterized, after acid hydrolysis, by qualitative and quantitative analysis of their components. The three were identified as Floridean starch, which contained only glucose (the absorbance spectrum and blue value, measured at 680 mμ, indicate this starch contains mostly amylopectin); hypnean, which contained 44.1% galactose, 24.3% 3,6-anhydrogalactose, 5.3% 6-O-methylgalactose, and 10.8% ester sulfate; and a sulfated polysaccharide very similar to λ-carrageenan (it contained 57.2% galactose, 2.8% 3,6-anhydrogalactose, and 32.5% ester sulfate).

The hypnean, which has characteristics indicating possible practical uses, shows a molar ratio of 5:3:2 for galactose, 3,6-anhydrogalactose, and SO<sub>3</sub>Na, respectively. The influence of seasonal variations on the average chemical composition of hypnean and on the cations linked to the sulfate group was examined; the variation of the cations in particular was related to the salinity of the surrounding water. [4 figures, 5 tables, 39 references]

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6.54

RELATIVE UTILIZATION OF CASEIN, FISH PROTEIN CONCENTRATE AND  
ISOLATED SOYBEAN PROTEIN FOR GROWTH AND PANCREATIC ENZYME  
REGENERATION OF THE PROTEIN-CALORIE MALNOURISHED BABY PIG

Pond, Wilson G., and Wesley Snyder (Department of Animal Science, Cornell University, Ithaca, N.Y. 14850), Jean Twombly Snook, Earl F. Walker, Jr., Deborah A. McNeill, and Bruce R. Stillings

Journal of Nutrition 101, No. 9, 1193-1200 (September 1971)

Forty-eight Yorkshire pigs weaned at 3 weeks of age were used in a protein depletion-repletion experiment to compare the adequacy of casein, isolated soy protein (ISP) or fish protein concentrate (FPC) for rehabilitation from protein-calorie malnutrition. All repletion diets were fed ad libitum at 13% protein. After 6 weeks depletion on a 3% protein-20% fat diet, weight gain was nil and total serum protein and serum albumin and pancreas weight, trypsinogen, chymotrypsinogen, amylase and lipase were severely reduced. Chymotrypsinogen and amylase activity per gram of pancreas were also significantly less than in controls. Pigs fed ISP during repletion had significantly lower weight gain after 6 weeks than pigs fed casein or FPC. After 3 weeks, control pigs had higher serum protein and albumin concentrations, larger pancreases with more total enzyme activity than pigs fed repletion diets. All repletion diets produced a similar pancreatic response except that pigs fed ISP had less amylase per pancreas and per gram of pancreas than pigs fed other repletion diets. After 6 weeks, total serum protein and serum albumin were similar in control and repleted pigs fed casein or FPC. Pigs fed ISP had significantly lower concentrations of each. Pancreatic size and enzyme content continued to be greater in control pigs than in repleted pigs after 6 weeks

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7.53

A COMPACT EXTRACTION APPARATUS FOR USE WITH THE  
SEMIMICRO METHOD FOR DETERMINING TOTAL LIPIDS IN FISH MEAL

Miller, Harry, Jr., and George M. Knobl, Jr. (National Center for Fish Protein Concentrate, Bureau of Commercial Fisheries, College Park, Md. 20740)  
Journal of the Association of Official Analytical Chemists 54, No. 5, 1132-1134 (September 1971)

The authors designed a compact glass extraction apparatus for use in the semi-micro chloroform-methanol extraction method for determining lipids in fish meal [M. E. Ambrose, B. J. Roche, and G. M. Knobl, Jr., JAOAC 52, 688-692 (1969)].

[1 figure, 1 table, 3 references]

FTP

[31 figures, 4 tables, 148 references]

In this review the authors summarize the achievements in the technology of glass capillary columns and their properties. They discuss in detail the instrumental aspects of work with glass capillary columns. Several applications in the biochemical research field are described to demonstrate the value of high resolution gas chromatography. These selected applications involved research in steroid hormones, steroids and steroid esters, fatty acids, pesticides, drugs, carbohydrates, amino acids, and aroma constituents.

Chromatographic Reviews 14, No. 1, 1-44 (May 1971)

Novotny, M., and A. Zlatkis (Department of Chemistry, University of Houston, Houston, Tex. 77004)

GLASS CAPILLARY COLUMNS AND THEIR SIGNIFICANCE  
IN BIOCHEMICAL RESEARCH

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8.0 STUDIES ON CHEMICAL COMPOSITION OF CUTTLEFISH (*SEPIA* SP.)  
(1.89) NEAT AS RELATED TO ITS NUTRITIVE VALUE

Dąbrowski, Teofil, Edward Kołakowski, Anna Kołakowska, and Barbara Karnicka (Department of Fish Processing Technology, Wyższa Szkoła Rolnicza, Szczecin, ul. Broniewskiego 1, Poland)  
Zeszyty Naukowe 31, Acta Ichthyologica et Piscatoria I, 145-158 (1970)

The rising demand for animal protein on the one hand and the slow but visible reduction of the more conventional fish stocks on the other dictates a look at some of the sea's less commonly used resources. Among the latter are the cephalopods. In the last few years, world catches of squid and cuttlefish have fluctuated between 1.0 and 1.8% of the total fish catch. These amounts could easily be multiplied, particularly from the resources of the North and Middle Atlantic and the North Sea. Several investigators have shown that squid is a valuable nutritional source; the present authors investigated the nutritive value of cuttlefish flesh. They report the basic chemical composition of the edible flesh, the composition of the free and the bound amino acids, the caloric value of the flesh, and the properties of the proteins relative to their solubility. They also compare the chemical composition of cuttlefish with that of squid caught at the same time on the same fishing grounds.

Morphometric analysis showed that the average length of 32 cuttlefish (measured from the socket joints of the arms to the end of the mantle) was 24.5 cm.; the average yield of edible flesh (the arms, all the mantle except the internal skeleton, and all the head except the keratose beak) was 65.7%; the yield of edible flesh increased as the length and weight of the fish increased; the ratio of mantle flesh to edible flesh from arms and head was 2.2:1.

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(over)

9.10 SHIP CANALS AND AQUATIC ECOSYSTEMS

Aron, William I. (National Oceanic and Atmospheric Administration, Washington, D.C. 20230), and Stanford H. Smith (Great Lakes Fishery Laboratory, U.S. Fish and Wildlife Service, Ann Arbor, Mich. 49107)  
Science 174, No. 4004, 13-20 (October 1, 1971)

Significant biological changes effected by environmental modifications are often not detected until long after the initial change has taken place. The initial impact is a deceptive measure of the long-term, and often more important, changes that take place in the ecosystem. The authors discuss two engineering projects that support this premise: (1) construction of the Erie (1819 and 1825) and Welland (1829) Canals (bypassing the block between Lake Ontario and Lake Erie created by Niagara Falls) and (2) construction of the Suez Canal (1869) (between the Red Sea and the Mediterranean Sea). In each of these areas there was a long lag between the physical completion of the project and the appearance of biological changes. The changes in the Great Lakes, when they did occur, were explosive and resulted in major shifts in the abundance, composition, distribution, and growth of the fish fauna throughout the lakes. In the areas of the Suez Canal, the biological changes were more gradual but nevertheless dramatic. The authors discuss the biological impact of these two engineering achievements, then speculate on the biological implications of the proposed sea-level canal in Central America.

The problems predicted by scientists in the 1930's concerning the sea lamprey were based on knowledge of the Great Lakes ecosystem gained from detailed observations and data collected for more than a century. For waters off Central America (area of the proposed sea-level canal) the data necessary for predictive capability

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(over)

9.11

PROPERTIES AND STABILITY OF A TEXAS BARRIER BEACH INLET

Mason, Curtis, and Robert M. Sorensen (Oceanography and Civil Engineering Departments, Texas A&M University, College Station, Tex.)  
Sea Grant Publication No. TAMU-SG-71-217, 1x + 166 pp. (August 1971) (Coastal and Ocean Engineering Report No. 146-C.O.E.)

An environmental study was conducted at Brown Cedar Cut, a natural unstable barrier beach inlet connecting East Matagorda Bay, Texas, with the Gulf of Mexico. The objectives of this study were to determine the physical and hydraulic properties of the inlet, and to investigate the inlet's historical stability, as well as its short-term response to a number of physical processes. Results of the study indicate that hurricanes and continuing erosion of adjacent beaches enhance the long-term stability of the inlet. During winter months, the rapid passage of strong frontal systems and associated winds, as well as substantial amounts of rainfall, are primarily responsible for the day-to-day viability of the channel boundaries. In the absence of such forces, the predominance of littoral drift over the limited flushing ability of astronomical tidal currents leads to degradation of the inlet channel and westward migration of the entire inlet system.

[77 figures, 4 tables, 59 references] Authors' abstract

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9.12

AGE, GROWTH AND CHANGES OF WEIGHT PROPORTIONS AND OF CHEMICAL COMPOSITION OF EEL DURING ITS LIFE IN POLISH WATERS

Piątek, Mieczysław (Department of Ichthyology, Wyższa Szkoła Rolnicza, Szczecin, ul. Kazimierza Krolewicza 4, Poland)  
Zeszyty Naukowe 31, Acta Ichthyologica et Piscatoria I, 73-96 (1970)

The author examined the biological technical and chemical characteristics of 499 yellow eels, 96 silver eels, and 51 eels caught along the Atlantic coast of France. The silver eels were netted in the sea, on the way to the spawning ground 57% of the yellow eels were netted as they were moving inshore from the sea, 30% after they had reached the Vistula River estuary, and 13% after they had reached the inland lakes. Biological data cover length, weight, age, annual increase in length and weight (in grams and in percent), and weight-to-length ratio of silver and yellow eels by sex, by age, and by area of capture. Technical data cover the weight of the various body parts (head, intestines, liver, bones, skin, fillets) relative to total body weight; these data are given for yellow eels and for male and female silver eels. Chemical data cover protein, water, fat, mineral, vitamin, and ash content of both types of eels, by sex, by body part, and by age; fat content is also shown by capture area. The percent protein, fat, water, and ash for narrow-headed and wide-headed eels is also given relative to the eels' age.

Male silver eels had the highest fat content. Eels living in inshore waters had somewhat less fat, and eels living inland had the least fat of all. In narrow-headed eels, protein and water content decreased with age (from 15.4 to 13.9% and from 58.9 to 56.4%, respectively), whereas fat content increased nonuniformly over a range of 24.0 to 27.2%. In wide-headed eels of analogous age groups, protein and water content ranged from 15.9 to 20.9% and from 61.0 to 66.5%, respectively,

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## DETERMINED BY PHEROMONES?

Nordeng, Hans (Zoological Laboratory, University of Oslo, Box 1050, Oslo 3, Norway) Nature 233, No. 5319, 411-413 (October 8, 1971)

The author presents data to support the suggestion [H. C. White, Transactions of the American Fisheries Society, 360 (1934) and H. C. White, Report of the Biological Board of Canada 1933, 41 (1934)] that the standing fish population in a river conditions the water in such a way that individuals on their way back from the sea recognize the stream in which their relatives are living. He further suggests that the attractant may be substances that are excreted in the mucus. The investigation areas were the Salangen River system and Lølsebotn River system in northern Norway and the Vangsvatn Lake area in southern Norway.

[1 figure, 2 tables, 10 references]

TFP

This article provides additional evidence that certain copepods (mainly calanoid ones) form a membrane encasing voided diatom shells. These pellets sink many times faster than a single shell and thereby rapidly transport silica from surface waters to deeper waters. [4 figures, 30 references] FTP

Schrader, Hans-Joachim (Geologisch-Paläontologisches Institut und Museum der Universität Kiel, 23 Kiel, Germany)  
Science 174, No. 4004, 55-57 (October 1, 1971)

### 9.11 FECAL PELLETS: ROLE IN SEDIMENTATION OF PELAGIC DIATOMS

## PRIMORDIAL OIL SLICK

Lasaga, Antonio C., and H. D. Holland (Department of Geological and Geophysical Sciences, Princeton University, Princeton, N.J. 08540), and Michael J. Dwyer (Graduate Group on Molecular Biology, University of Pennsylvania, Philadelphia, Pa. 19104)  
Science 174, No. 4004, 53-55 (October 1, 1971)

The authors suggest, on the basis of calculations and some preliminary experiments, that an early methane atmosphere would have been polymerized by solar ultraviolet radiation in geologically short periods of time. Further, an oil slick (1 to 10 m. thick) could have been produced in this manner and may have been of significance in the development of life.

[3 figures, 1 table, 28 references]

FTP

[12 figures, 6 tables, 34 references]

did fat content, which ranged from 12.2 to 17.2%. The technical characteristics--that is, the ratio of consumable meat to total body weight--govern the eels' value. Although the yellow eels were slightly longer, the silver eels yielded a slightly higher percent of skinned fillets relative to total body weight.

9.12 (1.9)(8.0)

[2 figures, 5 tables, 18 references]

Edible part	Cephalopod species	Water %	Fat %	Ash %	Protein		Caloric value Kcal./100 g.
					Total %	Pure %	
Mantle	Cuttlefish	76.66	0.23	1.62	18.81	13.91	88.03
	Squid	75.77	0.72	1.42	19.29	13.26	94.84
Arms and head	Cuttlefish	78.77	0.29	1.48	17.17	13.43	80.45
	Squid	77.69	0.87	1.51	17.53	12.75	87.55

Chemical and nutritional composition of cuttlefish and squid

The protein of cuttlefish is richer in cystine, lysine, arginine, proline, and methionine than that of fish; it is poorer in glycine, alanine, tyrosine, serine, glutamic acid, and valine. The other amino acids are about equal to those in fish.

Chemically, the edible flesh is 77.3% water, 0.25% fat, 1.58% ash, and 18.29% protein; nonprotein nitrogen averages 0.746%. Of the proteins, 76.3% is soluble, 19.49% of the total being soluble in water, the "sarcoplasmic" proteins, and 56.83% being miofibrillar [myofibrillar?] (the calculated difference between the amount of protein soluble in water and the amount soluble in 0.05% sodium hydroxide solution and consisting of globulin and residual intracellular protein); 26.63% is stroma protein--that is, protein insoluble in 0.05% NaOH. Of the 20 free amino acids present, proline averages 344.7 mg.%, over 32%. Other amino acids present in large amounts are taurine (229.5 mg.%), alanine (97.8 mg.%), arginine (94.2 mg.%), and lysine (48.8 mg.%). Eighteen of the amino acids are basic; all the eggogenic

9.11 INTERSTITIAL SILICA AND PH IN MARINE SEDIMENTS  
(7.41) SOME EFFECTS OF SAMPLING PROCEDURES

Fanning, Kent A., and Michael E. Q. Pilson (Graduate School of Oceanography, University of Rhode Island, Kingston, R.H.)  
 Science 173, No. 4003, 1228-1231 (September 24, 1971)

The authors present experimental data that show ways in which sampling procedures can alter the composition of interstitial water. They studied these effects on silica and phosphate concentrations and on pH and alkalinity. They found that the temperature at which the interstitial water was squeezed from a marine sediment had a pronounced effect on the measured interstitial silica concentrations; the silica concentrations showed an increase of 51% after the sediment was exposed to a temperature of 20° C. higher than the *in situ* temperature. Such effects were not obtained for interstitial phosphate or alkalinity, but the pH was slightly higher in the water squeezed at the higher temperature. Until the exact nature of the temperature effects are determined, the authors suggest that all future data on the pH and silica concentrations of pore waters of marine sediments should be obtained from samples extracted at *in situ* temperatures.

[1 figure, 3 tables, 32 references]

FTP

[5 figures, 1 table, 54 references]

are lacking except for a few commercial species of fish. Knowledge of the marine fauna and flora of Central America are meager particularly relative to their ecological interactions and their kinds and distributions. The basic data for development of predictive models are needed in order to diagnose the problems posed by a sea-level canal in advance of construction.

9.10



9.125 FISH OTOLITHS: DAILY GROWTH LAYERS AND PERIODICAL PATTERNS

Pannella, Giorgio (Department of Geology and Geophysics, Yale University, New Haven, Conn. 06520)  
Science 173, No. 4002, 1124-1127 (September 17, 1971)

As long as 40 years ago vague references to subseasonal rings and lamellae on teleost otoliths appeared in the literature. Up until now, however, no attempt has been made to interpret the chronological meaning of these rings. The data presented here show that early-stage annual rings in the otoliths of several species of teleost consist of thin bands corresponding in number to the number of days in the year. In addition to these daily increments (made of densely packed and sparsely packed bands of organic fibers), the recurrent patterns of these bands appear as frequency peaks, their periodicity being weekly, fortnightly, monthly, and seasonal. Preliminary data from investigations of other species living at various depths and in different climates indicate that daily growth may be a universal characteristic of fish otoliths.  
[2 figures, 16 references]

LB

(Lebedinskiĭ, N. A. A. N. S. S. R.)  
Chemical Abstracts 74, No. 21, 108744n (May 24, 1971)

EFFECT OF SMALL CONCENTRATIONS OF PHENOL ON A CHANGE  
IN THE LEVEL OF TRACE ELEMENTS IN CARP

13.6

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9.14 REPRODUCTION OF LUMBRICILLUS RIVALIS (LEVINSEN) IN LABORATORY CULTURES AND IN DECAYING SEAWEED

Kirk, R. G. (Ministry of Agriculture, Fisheries and Food, Marine Hatchery, Port Erin, Isle of Man)  
Annals of Applied Biology 67, No. 2, 255-264 (March 1971) (Cambridge University Press, Bentley House, 200 Euston Road, London N.W.1, England)

Lumbricillus rivalis has been used for several years as a live food for cultured plaice and sole. More recently it has been used as a food for juvenile prawns. The fecundity (egg or sperm production) and fertility (the number of eggs that develop into living young) of 144 of these worms, cultured in pairs at 10<sup>±</sup> 1° C. in the laboratory and in decaying wrack (Fucus) were studied. In the laboratory, cocoon deposition lasted for between 1 and 16 weeks; a mean of 17.4 eggs was deposited per cocoon. Of the cocoons transferred from the site of deposition, 31% hatched; of those left in horse manure substrate, 92% hatched. Cocoon and egg production in wrack-bed populations was low in autumn and maximum in late winter-early spring; the mean egg content for these two seasons was 17.1 and 47.8 per cocoon, respectively. Of the cocoons detached from the seaweed fronds, 19% hatched; 62% of those left in place hatched. Over 50% of the fertile eggs hatched and developed into at least 5-mm. worms.

Since large-scale culture techniques for adult worms have yet to be developed, the author suggests that young L. rivalis hatched from cocoons collected during the winter and spring, when they are most abundant, may be cultured as an interim solution to the aquaculturist's problem of obtaining worms in summer. Theoretically they would provide a continuous supply of live food for at least 3 months in late spring and early summer. Although collecting cocoons, from the wrack beds of the

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(over)

9.16 LIVE CARS FOR USE IN CATFISH INDUSTRY  
(1.92)

Greenland, Donald C., and Robert L. Gill (National Marine Fisheries Service, Kelleys Ark.), and James C. Hall (Foods Multinational Ltd., Bank of America Bldg., San Pedro Sula, Honduras, C.A.)  
Commercial Fisheries Review 33, Nos. 7-8, 44-53 (July-August 1971)

Live cars--mesh "fish-holding bags"--have a variety of applications in the production of pond-raised channel catfish (Ictalurus punctatus). When used in harvesting and holding catfish, the fish can be moved easily to loading sites or shifted to safe areas for holding. When used along with a haul seine, pulling techniques are modified so the seine forms a "chute" during the final stages of seining. ...

Information on holding capacities and a method to accurately meter fish into live cars are needed by fish farmers to better utilize these units. As more data are developed on live car holding capacities, and new applications found, live cars will be accepted as useful tools in catfish farming.

[9 figures, 2 references] From the Authors' abstract

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9.19 ACCUMULATION OF YELLOW PHOSPHORUS BY SEVERAL MARINE INVERTEBRATES AND SEAWEED  
(9.13)(6.32)  
(1.80)

Fletcher, G. L. (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 28, No. 5, 793-796 (May 1971)

Lobsters, clams, quahogs, periwinkles, mussels, starfish, and seaweed exposed for 48 hr. to water containing 15±9 µg./liter of yellow phosphorus accumulated the pollutant from the water in varying amounts. The concentration of yellow phosphorus in whole animals ranged from that in mussels (10 times the amount in the water) to that in periwinkles (40 times that in the water). The concentration in both Fucus vesiculosus and F. distichus was about 20 times that in the water. Even higher concentrations were found in the pyloric ceca of the starfish (100 times that in the water) and in the ovary and hepatopancreas of the lobster (from 300 to 1,000 times that in the water). When all the test organisms (except the lobster) were transferred to water free of yellow phosphorus, they were able to free themselves of the accumulation within 7 days. Lobsters were then exposed to 23.0-7.0 µg./liter of yellow phosphorus; the time for 50% of them to die was 620 hr. This finding confirms the data of Zitko et al. (1970) that yellow phosphorus is considerably less toxic to lobsters than it is to teleost fish.  
[2 tables, 14 references]

LB

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9.14

supralittoral fringe and incubating them is not the final solution to the problem of providing live food for fish culture work, it at least extends the period during which worms can be fed as the main diet.  
[1 figure, 4 tables, 12 references]

LB

9.19

ACCUMULATION OF DDT BY DAPHNIA MAGNA

Crosby, Donald G., and Richard K. Tucker (Department of Environmental Toxicology, University of California, Davis, Calif. 95616)  
Environmental Science & Technology 5, No. 8, 714-716 (August 1971)

Because *Daphnia magna*, the water flea, is an important segment of the first animal link in the aquatic food chain, the authors measured the amount and the distribution of the DDT accumulated by this organism during the first instar. They found that *Daphnia* exposed to 8 p.p.b. DDT in water for 24 hr. accumulated 16,000-fold concentrations; those exposed to 50 p.p.b. accumulated 23,000-fold concentrations. In the first instance, organisms weighing 9 µg. and swimming in 50 ml. of water took up 7.2% of the available amount of DDT within 26 hr.; in the second instance, they took up 10.4%. About 75% of the total uptake occurred within the first hour of exposure; a significant part of the total was adsorbed by the exoskeleton.

The uptake of DDT by the whole body of the *Daphnia* was roughly proportional to the log of the DDT content of the water. *Daphnia* exposed to 50 p.p.b. DDT for 26 hr. accumulated 1,150 mg. DDT/kg. body weight; those exposed to 8 p.p.b., accumulated 128 mg. DDT/kg. body weight. DDT levels of 10 p.p.b. in natural waters are not uncommon. Although this concentration would probably not intoxicate most fish species, a 1-g. fish eating only 10 mg. of *Daphnia* that had been exposed for a day to water containing 10 p.p.b. DDT would receive an oral dose of about 1.5 mg./kg of body weight; 3 mg./kg. is near the level of acute toxicity for cutthroat trout. [1 figure, 3 tables, 12 references]

LB

9.14

## FISH REQUIRE DIETARY VITAMIN C

Anonymous  
Nutrition Reviews 29, No. 9, 207-210 (September 1971)

When fingerling trout or salmon are fed a ration lacking vitamin C growth is retarded and mortality increased. The curvature of the spine which develops probably reflects altered collagen synthesis, suggesting that the primary defect in fish is similar to that in guinea pigs and primates.  
Reprinted

## USE OF SUGAR FACTORY WASTE

(61.6)

Anonymous

FAO Aquaculture Bulletin 3, No. 3, 7 (April 1971)

Scientists from the Institute of Water Biology, Polish Academy of Sciences, Krakow, are beginning a second series of experiments on growing fish in the diluted waste waters from a sugar-beet factory. The first series, conducted between 1966 and 1968, proved the feasibility of the practice. In the second series, suitable rates of dilution and an appropriate operational sequence will be determined.

Wastes are kept during winter and early spring in a deep holding pond, without fish. There certain anaerobic self-purification occurs. In late spring, fishponds are filled with the water from the holding ponds, the water being diluted according to the amount of organic matter contained. When the fishponds are emptied in autumn after the harvest, the water has been purified to such an extent that no pollution effects can be observed on receiving waters.

LB

The report contains eight photographs and three references.

LB

Aquaculture 1, No. 2, 31-36 (February 1971) (In Chinese)

Huang, T. L. (Taiwan Fish Culture Station, Taiwan Fisheries Research Institute), and C. P. Hung (Tungkang Marine Laboratory, Taiwan Fisheries Research Institute, Tungkang, Pingtung, Taiwan, 916)

Crab culture in southeastern Taiwan

9.16

(1.86)

## CRAB CULTURE IN SOUTHEASTERN TAIWAN

Fisheries Researchers have applied unidirectional pulsed electrical fields in fresh-water streams and lakes in (1) qualitative and quantitative population studies, (2) control of unwanted species, (3) collection of fish for transport and planting, and (4) energizing of screens (electrode arrays) to frighten or divert fish away from dangerous environments.

In the present experiments, control (or unshocked) and shocked (or test) rainbow trout (*Salmo gairdneri*) were held through spawning to determine the effects of electrical shock on the survival, growth, and fecundity of two year classes--young of the year of the 1953 year class and yearlings of the 1952 year class--on the survival of the eggs and of the fry of the exposed fish. The survival, growth, and fecundity of the fish apparently were not affected by the electrical shock, nor were the survival and development of their offspring.

[6 tables, 24 references]

FTP

9.16

## SURVIVAL, GROWTH, AND FECUNDITY OF HATCHERY-REARED RAINBOW TROUT AFTER EXPOSURE TO PULSATING DIRECT CURRENT

Maxfield, Galen H., Robert H. Lander, and Kenneth L. Liscom (National Marine Fisheries Service, Biological Laboratory, 2725 Montlake Boulevard East, Seattle, Wash. 98102)

Transactions of the American Fisheries Society 100, No. 3, 546-552 (July 1971)



Anonymous

Chemical Engineering 78, No. 14, 276 pp. (June 21, 1971)

This "Deskbook Issue" is divided into four major sections:

## I - Pollution Control Law

Current Legislation, pp. 9-13; by Steven Ross (news editor of "Air and Water News"). Covers air act amendments, refuse act enforcement, upcoming water legislation, ocean dumping, other environmental legislation, and prospects for enforcement. [1 table]

State Regulations, pp. 19-44; anonymous. A summary of water and air pollution codes, by state.

## II - Technology

Water Pollution Control, pp. 65-75; anonymous. An economic-engineering review of present techniques for treating wastewater and thermal pollution, with a view toward the challenge of cutting costs and raising efficiency. [8 figures, 6 tables, 8 references]

Upgrading Waste Treatment Plants, pp. 97-102; by G. L. Shell, J. L. Boyd, and D. A. Dahlstrom (Eimco Processing Machinery, Division of Enviro-tech Corp., P.O. Box 300, Salt Lake City, Utah 84110). Method of up-grading and illustrative case histories. [4 figures, 4 tables]

Air Pollution Control, pp. 131-141; anonymous. Tightening laws regulating emission rates and the consequent need to review control techniques and upgrade facilities. [11 figures, 3 tables]

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## ECONOMIC EVALUATION OF FORECASTS OF SOCKEYE SALMON (1.32)(1.0112) (ONCORHYNCHUS NERKA) RUNS TO BRISTOL BAY, ALASKA

Mathews, Stephen B. (Management and Research Division, Washington State Department of Fisheries, Olympia, Wash.)

FAO Fisheries Technical Paper No. 103, iv + 17 pp. (May 1971)

Several fisheries agencies operating in Alaska spend an aggregate of \$100 000-\$250 000 yearly to forecast the sockeye salmon (*Oncorhynchus nerka*, Walbaum) runs to Bristol Bay. Accurate forecasts of this widely varying run allow the salmon canning industry to plan efficient yearly scales of operation. Also, accurate forecasts, particularly of the runs to the separate rivers of Bristol Bay, should increase the productivity of the runs by enabling management for optimum escapement. To measure the potential economic value to the canning industry of accurate forecasts, a computer model of the fishery and the canning industry was written and used to simulate performance over 100-year periods.

A moderately accurate forecast provided benefits almost as great as a highly accurate forecast. In view of the much greater cost for a highly accurate forecast, optimum investment in a forecasting programme might be that which gives only a moderate level of accuracy.

It was concluded that the benefits to the canning industry from forecasting would likely be dissipated in higher raw fish costs if profits were reasonable without accurate forecasts. Higher fish prices with free entry of fishing gear would attract more but superfluous gear which would negate any net economic gain from forecasting.

In order for forecasts to provide their greatest yield to the fishery where net yield is the total profit to the canning industry and the fishing fleet, the

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## 9.2 GROWTH OF PRODUCTION IN FISHERIES IN RELATION TO INVESTMENTS ON LAND, INVESTMENTS IN VESSELS AND TO LABOUR

Niegolewski, Andrzej, Andrzej Daniszewski, and Wacław Piaszczyński (Department of Economics, Wyższa Szkoła Rolnicza, Szczecin, ul. Kazimierza Krolewicza 4, Poland)

Zeszyty Naukowe 31, Acta Ichthyologica et Piscatoria I, 159-174 (1970)

The authors analyze the factors that determine the growth of production in fisheries, defining the productivity of particular factors and the permissible degree of their intersubstitution. The results can be used as a basis for the proper allocation and the optimal proportion of investments to be made in fisheries. Statistical estimations were based on data recorded from 1958 through 1967 for fishing, processing, and fish-port services. Factors considered were the total value of goods and services produced for sale by industrial enterprises (marketing investments were not included); the total investments made by industrial enterprises on vessels (the purchase of new ships or the modernization of old ones) and on shore-based installations; and the labor force employed by these enterprises (not only the force actually working aboard fishing vessels and mother ships but the force remaining in the labor pool).

All the production factors proved to be highly intercorrelated. The highest correlative coefficient is between labor and investments ashore; the lowest, between quantity of production and investment in vessels. The value of production is related, in descending order, to land investments, labor, and finally, at the lowest grade, to investments in vessels. Among the authors' conclusions are (1) the scale of growth in production decreases as its factors increase; (2) the coefficient of elasticity for investments ashore is much higher than are those for the

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## A CASE FOR FISHERY COOPERATIVES

Stolting, Walter H. (Office of the Assistant Director for Economics, National Marine Fisheries Service, Washington, D.C. 20235)

Fishing Gazette 88, No. 7, 22-23, 45-47 (July 1971)

The Fishery Cooperative Marketing Act (15 U.S.C. 521, 522, signed into law on August 11, 1934, by President Roosevelt) is similar but not identical to the Capper-Volstead Act, which authorizes cooperative marketing associations for farmers. It has two sections. Section 1 authorizes commercial fishermen to act together to collectively process and market aquatic products; however, it limits each member to one vote in deciding the affairs of the cooperative, it restricts dividends on common stock to 8%, and it prohibits the cooperative from doing more business with nonmembers than with members. Section 2 prohibits undue price increases on products sold the public; the Secretary of Commerce is responsible for seeing that this prohibition is observed, the Federal District Courts for enforcing the Secretary's orders.

Several economic principles underlie the reason for the Act's existence. Collective action by fishermen increases their economic power. It offsets the disadvantages of limited marketing outlets and creates a bargaining organization that can match skills with large-scale buyers. By assuming many of the land-based functions of the industry, it allows the individual fisherman to devote more time to fishing, thus reducing his unit costs.

The legal concepts expressed on pages 166, 172, and 173 of Farmer Cooperative Service Bulletin No. 10, "Legal Phases of Farmer Cooperatives," apply equally to fishery cooperatives. (1) Acting alone and not in concert with other cooperatives,

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9.2 (1.1) (1.2) (1.3) (1.4) (1.5) (1.6) (1.7) (1.8) (1.9) (1.10) (1.11) (1.12)

fleet would need to be greatly reduced. In the simulation model, a fleet of 350 boats was optimal. With this small-sized fleet, an accurate forecast of the total run added \$1 200 000 to net yield, and accurate river-system forecasts about \$5 000 000.

[5 figures, 5 tables, 12 references]

From the Author's abstract

FTF

[212 footnotes]

For a more extensive discussion of the 200-mile dispute the author refers readers to his forthcoming book "The 200-Mile Sovereignty Controversy" to be published in 1971.

9.3 THE UNITED STATES -- PERUVIAN "FISHERIES" DISPUTE

Loring, David C. (Clerk to Chief Justice Donald R. Wright, California Supreme Court)

Stanford Law Review 23, No. 3, 391-453 (February 1971)

The author's purpose in this article was to provide an impartial analysis of the United States-Peruvian controversy. The article is in five parts. Part 1 traces the background and growth of the disputes. Part 2 is an outline of the legal arguments used by both sides. Part 3 delineates the basic interests that each side believes are at stake. Part 4 is a survey of the strategic policies the parties have adopted to further their interests. In Part 5 the author discusses the path that the United States might take to reduce tension and produce a mutually acceptable solution.

9.4

a cooperative cannot be prosecuted as a monopoly. (2) Two or more cooperatives combining to fix the price of their products are exempt from antitrust laws as long as no other organization or member of such organization is taken into the combine. (3) Cooperatives have all the legal rights, privileges, and powers of regular business firms, including the right to select their members and their customers. (4) They cannot, however, blacklist certain buyers, penalize members who deal with certain buyers, or boycott nonmembers who deal with certain buyers.

In 1969, 78 fishery cooperatives were operating in the United States; 6 were engaged in service activities, 4 were selling supplies to fishermen, and 68 were engaged in some kind of marketing function, either alone or along with service or other activities. All together they had 9,416 members, most of whom were vessel owners or managers; these members operated 6,829 vessels, many of which were 5 net tons or larger. In the past few years, commercial fishermen who are cooperative members have controlled about 25% (by value) of the U.S. catch, most of which is sold through the cooperative.

Although two cooperatives failed in the 1950's as a result of intense competition from other distributors, the benefits have far outweighed the losses. Considerably more than \$1,000,000 saved by purchasing supplies and marketing the product was refunded to members during the 1960's. More favorable prices have been paid, long unloading delays at producer-distributors' docks have been eliminated, marketing areas have been extended, and more sophisticated products produced. One cooperative handles and processes most of the catch landed at the home port; it also owns and operates a fishmeal plant. The result is improved financial and social status of the members. Members of several cooperatives have realized appreciable savings through the supply-purchasing and insurance-underwriting activities of their cooperative.

(8.0) 61.6

9.3

THE UNITED STATES -- PERUVIAN "FISHERIES" DISPUTE

Loring, David C. (Clerk to Chief Justice Donald R. Wright, California Supreme Court)

Stanford Law Review 23, No. 3, 391-453 (February 1971)

The author's purpose in this article was to provide an impartial analysis of the United States-Peruvian controversy. The article is in five parts. Part 1 traces the background and growth of the disputes. Part 2 is an outline of the legal arguments used by both sides. Part 3 delineates the basic interests that each side believes are at stake. Part 4 is a survey of the strategic policies the parties have adopted to further their interests. In Part 5 the author discusses the path that the United States might take to reduce tension and produce a mutually acceptable solution.

For a more extensive discussion of the 200-mile dispute the author refers readers to his forthcoming book "The 200-Mile Sovereignty Controversy" to be published in 1971.

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SEABED RESOURCES: THE PROBLEMS OF ADOLESCENCE

Newton, W. Frank (International Law Office, Judge Advocate General of the Navy)  
San Diego Law Review 8, No. 3, 551-572 (May 1971)

The existing law appears most inadequate in the area of seabed resource development. (However, other areas of concern are the problems of land-locked countries, the breadth of the territorial sea, the question of international straits, fishing and conservation of the living resources of the high seas, and the preservation of the marine environment) In this article, the author examines the inadequacies of the law relating to exploitation of the seabed resources and outlines the reasons for this inadequacy. [85 footnotes]

LB

on an application of funds-absorption technical progress and on the increase of investments. [3 figures, 3 tables, 9 references]

other factors, meaning that investments on land bear decidedly on the growth of production--any increase of investment in vessels that is unrelated to investment ashore makes fishing activities less effective; (3) an increase in either labor or vessel investment without an increase in investment ashore will yield low returns and will indicate an improper allocation of funds; (4) no production growth can be achieved by an increased labor output without an increase in investments; (5) the growth of production in fisheries and the possibility of expansion depends on an application of funds-absorption technical progress and on the increase of investments. [3 figures, 3 tables, 9 references]

2.6



9.3 (9.19) THE CANADIAN ARCTIC WATERS POLLUTION PREVENTION ACT: AN ANALYSIS

Carnahan, Burt K.  
Louisiana Law Review 31, No. 4, 632-649 (1970-71)

The purpose of this article is to analyze the Canadian Arctic claim [Arctic Waters Pollution Prevention Act, 18 & 19 Eliz. 2, C. 47 (Can. 1970), reproduced in 9 International Legal Materials 543 (1970) and Mich. L. Rev. 38 (1970)] and to postulate standards by which such unilateral extensions of jurisdiction over maritime areas may be judged in the future.

FTP

[76 footnotes]

LB

[237 footnotes, 3 figures]

Morin, Jacques-Yvan  
Canadian Yearbook of International Law 1970, 158-248 (1970) (In French)

[Published under the auspices of The Canadian Branch, International Law Association. Address communications to the Editor, The Canadian Yearbook of International Law, The Faculty of Law, The University of British Columbia, Vancouver 8, B.C., Canada.]

9.3 (9.19) [TECHNICAL PROGRESS, POLLUTION, AND RECENT DEVELOPMENT IN THE LAW OF THE SEA IN CANADA, PARTICULARLY WITH REGARD TO THE ARCTIC] LE PROGRÈS TECHNIQUE, LA POLLUTION ET L'ÉVOLUTION RÉCENTE DU DROIT DE LA MER AU CANADA, PARTICULIÈREMENT À L'ÉGARD DE L'ARCTIQUE

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 1 PAGE 25

9.3 LAW OF THE SEA NEEDS FOR THE 1970'S

Wilkes, Daniel (University of Rhode Island, Kingston, R.I.)  
San Diego Law Review 8, No. 3, 453-458 (May 1971)

This article is the Foreword to the Law of the Seas III issue of this journal. Through the various articles in this symposium issue run four common facts, or "Reality Principles," which lie behind remodeling of the Laws of the Sea. These are (as stated): (1) "Most nations are 'have nots,' predicted to see ever vaster gaps with the 'haves'; in this context, 'have nations' are expected to take steps to offset this trend during the formulation of new international practice and rules." (2) "Thus, proposals by any 'have' nations of rules which specifically favor them because of their advanced technology will (a) have a low likelihood of adoption, and (b) tend to isolate their proponents from the mainstream of developing international law." (3) "Nations shall likewise have to come grips with widespread concern that rules proposed on one side or another as a result of alleged security motives may put other states into possibly intolerable jeopardy." (4) "Each coastal populace expects its government to protect any livelihoods which depend on fish and shellfish harvests or on recreational uses of beaches and near-shore waters." [1 footnote]

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9.3 (9.19) RECENT DEVELOPMENTS IN THE LAW OF THE SEAS II: A SYNOPSIS

McCabe, Michael J., Ignazio J. Ruvoilo, and M. Howard Wayne  
San Diego Law Review 8, No. 3, 658-694 (May 1971)

This article is a compilation of events relevant to law of the seas that took place from March 15, 1970 to March 1, 1971. It covers Conservation, Fishing, Minerals, Pollution, Shipping, and Sovereignty.

[76 footnotes]

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This nontechnical explanation of contemporary ocean law includes a definition of such legal concepts as internal waters, territorial seas, the contiguous zone, and the high seas, as well as a discussion of "resource zones," which include the continental shelf and exclusive fishing areas. The pamphlet is available free from Oregon State University Bulletin Mailing Office, Industrial Building, Corvallis, Oreg. 97331.

Jon L. Jacobson (School of Law, University of Oregon, Eugene, Oreg.)  
National Fisherman 52, No. 7, 29C (November 1971)

Anonymous  
Ocean Zones and Boundaries, 8 pp. (1971) Published by the Oregon State University Marine Advisory Program.

9.3 EIGHT-PAGE BOOKLET EXPLAINS OCEAN LAW

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 1 PAGE 25

9.6 (2.14)(2.110) BOOK CHAT

Heighway, Arthur J. (reviewer)  
Fishing News International 10, No. 8, 88 obv. (August 1971)

Fishing News (Books) Ltd., 110 Fleet Street, London, EC4A 2JL, England, has announced the early publication of half a dozen new or re-issued books. The three below should be available now. Each order should include an additional 5% of the book value (for postage and packaging).

Commercial Fishing Methods, Vessels and Gears (August 1971; £3.75)  
John C. Sainsbury

A practical, well-illustrated book for student and operating fisherman alike. Inshore Fishing--Its Skills, Risks, Rewards (August 1971; £2.65)  
Stan Judd

Contains practical pointers explained by diagrams. Foreword by Stephen Leach, chairman of the Fisheries Organisation Society.

Seafood Fishing for Amateur and Professional (September 1971; £3.00)  
R. C. O'Farrell

A merger of two books previously out-of-print: "Sea Fishing for Pleasure and Profit" and "Lobsters, Crabs and Crawfish."

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Glass Capillary Columns and Their Significance in Biochemical Research			[Annual Report of the Technological Laboratory of the Danish Ministry of Fisheries to the Danish Fishing Industry, 1970]	9	0.6
ANALYSIS, ORGANIC, LIPIDS	17	7.53	FRESH FISH, HANDLING AT SEA	9	2.15
A Compact Extraction Apparatus for Use With the Semimicro Method for Determining Total Lipids in Fish Meal			Biologist and Lobsterman Devise System To Bring Haul Back Alive		
ANTIOXIDANTS, APPLICATION	15	4.62	FRESH FISH, PROCESSING	9	2.3
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ANTIOXIDANTS, GENERAL	15	4.60	FROZEN FISH, PROCESSING		
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(Possibility of the Economic Use of the Algae of the Northern Adriatic.			Freezing Process (pat.)	12	3.2349
VI. The Chemical Composition and Seasonal Variability of Polysaccharides in <i>Hypnea musciformis</i> )			FROZEN FISH PRODUCTS		
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## COMMERCIAL FISHERIES ABSTRACTS

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FEBRUARY 1972

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Seattle, Wash.



# UNITED STATES DEPARTMENT OF COMMERCE

Maurice H. Stans, *Secretary*

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Philip M. Roedel, *Director*

### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



0.118  
(7.0)(4.11) A BIDIRECTIONAL RECORDING GASOMETER WITH SOLID STATE SENSING ELEMENT

Burkhardt, H. J., Morris F. Pool, and Carl Elliger (Western Regional Research Laboratory, Agricultural Research Service, USDA, Albany, Calif. 94710) Analytical Biochemistry 43, No. 2, 601-612 (October 1971)

In a projected study of autoxidation and antioxidants, the authors needed an automated method for measuring gas absorption and evolution. This gasometer had to show high flexibility and easy-handling characteristics, and its construction had to be chemically inert. Because no apparatus satisfying these requirements was available, the researchers designed a bidirectional recording gasometer using a pressure-sensitive transistor.

The authors state that the design of the instrument and the construction materials used in it permit a wide range of applications in which volume changes occur. They indicate that volumetric changes can be monitored independently of barometric changes, at different temperatures, and under partial vacuum or pressure. The instrument reads directly in volume units, recorded on a linear scale versus time. The instrument's response to pressure changes is fast and the instrument has shown high sensitivities in the order of  $10^{-4}$  of full scale. The samples can be introduced or withdrawn during operation through a septum-type injection port, or samples may, initially, be placed directly into the sample vessel.

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0.321  
(1.92) CRYSTAL DATA FOR LOW MOLECULAR WEIGHT ALBUMINS OF CARP

Kretsinger, R. H., Dorothea Dangelat, and R. F. Bryan (Departments of Biology and Chemistry, University of Virginia, Charlottesville, Va. 22903) Journal of Molecular Biology 59, No. 1, 213-214 (July 14, 1971)

To help clarify the relation between the primary and the tertiary protein structure of the atypical proteins--i.e., the low-molecular-weight albumins--of carp, the authors purified the three main components of the isolated albumin and grew crystals suitable for a 2.0 Å resolution structure determination. Because of their elution patterns and their electrophoretic mobilities, they assigned Hamoir's notation (1968) to these components--component 2 had no histidine and one proline; component 3 contained cysteine; and component 5 had no cysteine. Component 2 crystallized in several disordered forms elongated along b--the crystal data showed C2 with  $a = 28.2 \text{ Å}$ ,  $b = 61.0 \text{ Å}$ ,  $c = 54.3 \text{ Å}$ , and  $B = 95.10^\circ$ .

[1 figure, 1 table, 5 references]

LB

0.31  
(9.6) PROGRESS IN THE CHEMISTRY OF FATS AND OTHER LIPIDS, VOL. 10  
Holman, Ralph T. (editor)  
Chemical Abstracts 74, No. 25, 135366x (June 21, 1971)

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0.35  
(0.4)

BINDING OF CARCINOGENIC AROMATIC AMINE TO RAT LIVER NUCLEAR ACIDIC PROTEINS IN VIVO

Lotlikar, Prabhakar D., and Woon K. Paik (Fels Research Institute and the Department of Biochemistry, Temple University School of Medicine, Philadelphia, Pa. 19140) Biochemical Journal 124, No. 2, 443-445 (September 1971)

Chemical carcinogens, when administered to various species of mammals, cause covalent binding of these parent compounds (or their metabolites) to susceptible tissue macromolecules (such as proteins or amino acids). The degree of carcinogenicity of these chemicals is directly related to their molecular binding. No definitive evidence exists, however, to indicate that any particular macromolecular binding is involved in any way in the initiation of cancer.

Previous workers have also shown that 2-acetamidofluorene (AAF) and its metabolite N-hydroxy-AAF bind to liver cytosol basic proteins when the chemicals are administered to rats. Furthermore, previous work has shown that nuclear histones are involved in the binding of AAF and its metabolite N-hydroxy-AAF. In view of the suggestion by earlier workers that nonhistone nuclear proteins (such as acidic proteins) may play a role in the regulation of gene expression and function in cells of mammals, the present researchers carried out a study to determine whether these acidic proteins are involved in AAF binding in vitro.

E. J. Barry, C. A. Ovechka, and H. R. Gutmann [Journal of Biological Chemistry 243, 51 (1968)] suggested that acylation of histone by AAF might result in modified histones no longer capable of inhibiting DNA-dependent DNA or RNA synthesis; however, the present workers found that the fluorene residues were bound to nuclear acidic proteins more than to histones. Apparently, modification of these

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0.36  
(4.90)

WAX ESTERS IN FISH: TURNOVER OF OLEIC ACID IN WAX ESTERS AND TRIGLYCERIDES OF GOURAMIS

Sand, D. M., Jean L. Hehl, and H. Schlenk (The Hormel Institute, University of Minnesota, Austin, Minn. 55912) Lipids 6, No. 8, 562-566 (August 1971)

In this experiment, methyl U- $^{14}\text{C}$  oleate was fed to mature male and female gouramis (*Trichogaster cosbyi*) [a species of fish] and the radioactivity in their lipids was measured over a period of 4 months. The purpose was to study the metabolism of the 18:1 compounds and the interrelations of body and roe lipids for a period longer than the 24-hr. period of earlier experiments. Initial incorporations of  $^{14}\text{C}$  by the fish were 70-80%, and more than half of that was still in the lipids at the end of the experiments (4 months). Very little conversion of the 18:1 chain occurred; about 90% of the radioactivity was still in 18:1 chains and 10% was in other chains. Storage of the labeled 18:1 chain was mainly in the wax esters of the roe and in the triglycerides of the body. The 18:1 chains occurred in the alcohol and the acid moieties of the wax esters. In the female fish, the [U- $^{14}\text{C}$ ] 18:1 that had been initially deposited in the wax esters of the roe was transported to the triglycerides of the body. The authors estimate that the biological half life of 18:1 in gouramis is about 4 months--about the same for males as for females. However, translocation from roe to body and transformation of wax ester to triglyceride takes place in the female; whereas, wax esters do not play any role in the metabolism of lipids in the male gouramis.

[1 figure, 5 tables, 11 references]

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 1



Latman, E. (Thomas C. Jenkins Department of Biophysics, Johns Hopkins University, Baltimore, Md. 21218), Clive E. Nockolds (Department of Biology, University of Virginia, Charlottesville, Va. 22903), Robert H. Kretzinger,



0.34

ION BINDING BY SYNTHETIC MACROCYCLIC COMPOUNDS

Christensen, J. J. (Department of Chemical Engineering, Center for Thermochemical Studies, Brigham Young University, Provo, Utah 84601), J. O. Hill (La Trobe University, Bundoora, Victoria, Australia), and R. M. Izatt (Department of Chemistry, Center for Thermochemical Studies) Science 174, No. 4008, 459-467 (October 29, 1971)

Many synthetic macrocyclic compounds have hydrophilic cavities that contain multiple binding atoms and hydrophobic exteriors that allow them to solubilize ionic substances in nonaqueous solvents and in membrane media. Published data indicate that synthesis of macrocyclic compounds with specified or selected ion-binding properties is possible. The authors discuss the selective ion-binding characteristics of 12 classes of such compounds and mention some of their practical applications--as models for carrier molecules in studies of active ion transport in biological systems, as agents for removing or separating metals in solution (useful in such processes as water desalination or solution mining), as agents for solubilizing ionic substances in nonaqueous solvents, as drugs, as tools in the development of intriguing new areas of synthetic coordination chemistry. [2 figures, 6 tables, 5 references]

BT

0.5  
(0.33)  
EFFECT OF ILLUMINATION ON THE BIOSYNTHESIS OF CAROTENOIDS  
BY HYDROCARBON-OXIDIZING MYCOBACTERIA

Slivkina, O. I., and V. V. Kotlev (U.S.S.R.)  
Chemical Abstracts 74, No. 23, 121847c (June 7, 1971)

0.38  
DIFFERENZIERUNG VON ZWEI KATHEPSINEN AUS DORSCHMUSKEL  
[DIFFERENTIATION OF TWO CATHEPSINS FROM COD MUSCLE]

Musch, Klaus, and Günther Siebert (Lehrstuhl für Biologische Chemie und Ernährungswissenschaft, Universität Hohenheim, D-7 Stuttgart 70, Garbenstrasse 30), John V. Davies and Michael Ebert (Paterson Laboratories, Holt Radium Institute and Christie Hospital, Manchester, United Kingdom)  
Hoppe-Seyler's Zeitschrift für Physiologische Chemie 352, No. 6, 878-882 (June 1971) (In German; English summary) (Walter de Gruyter & Co., 1 Berlin 30, Genthiner Str 13, Berlin, Germany)

Chiefly on the basis of behavior toward ion exchangers and differences in molecular weight, the authors separated and differentiated two catheptic components from cod muscle. Histidine unequivocally participated in the active centers of both components; serine residues, cysteine residues, and metal ions were not involved in the catalytic process. Histidyl residues were also the main site of attack in both components under widely varied experimental conditions. Since these cathepsins do not meet Hartley's protease classification requirements, the authors propose a new class of imidazole proteases. [2 figures, 2 tables, 8 references]

BT

0.38  
(1.86)(1.87)  
ARGININE KINASE (ARTHRORHOD MUSCLE)

Bleehen, Sandra (San Francisco State Coll., San Francisco, Calif.)  
Chemical Abstracts 75, No. 13, 84434d (September 27, 1971)

0.39  
(0.4)(6.72)  
(1.30)

REQUIREMENT OF THE ADRENAL FOR CERTAIN URINE ELECTROLYTE EFFECTS  
OF SALMON CALCITONIN IN RATS

Aldred, J. P., R. R. Kleszynski, R. K. Stubbs, and J. W. Bastian (Department of Pharmacology, Armour Pharmaceutical Co., Kankakee, Ill. 60901)  
Proceedings of the Society for Experimental Biology and Medicine 137, No. 4, 1145-1151 (September 1971)

Doses of 0.5 MRC U/100 g. or greater of salmon calcitonin (CT) will produce an alkaline diuresis, natriuresis, chloruresis, hypercalciuria, hyperphosphaturia, and hypomagnesuria in the intact rat. Although salmon CT maintains full hypocalcemic activity in the adrenalectomized (adrenx) rat, it is otherwise inactive. Pretreatment of adrenx rats with hydrocortisone alcohol partially restored the natriuretic effect, although the magnitude of natriuresis was not as great as that in intact rats treated with CT alone. The ineffectiveness of hydrocortisone alcohol (and of other adrenal hormones) to restore in the adrenx rat the urine electrolyte excretion activity produced by salmon CT in the intact rat shows that the adrenal gland must be present if salmon CT is to be effective. [5 tables, 7 references]

LB

0.38  
ACID PHOSPHOMONESTERASE IN SOME SPECIES OF MARINE MOLLUSKS

Minafra, Salvatore (Fac. Sci., Univ. Palermo, Palermo Italy)  
Chemical Abstracts 74, No. 21, 108682x (May 24, 1971)

0.5

EFFECTS OF SODIUM CHLORIDE ON OUTGROWTH AND TOXIN PRODUCTION  
OF CLOSTRIDIUM BOTULINUM TYPE E IN COD HOMOGENATES

Boyd, J. W., and B. A. Southcott (Fisheries Research Board of Canada, Vancouver Laboratory, Vancouver 8, British Columbia)  
Journal of the Fisheries Research Board of Canada 28, No. 8, 1071-1075 (August 1971)

The spores of *Clostridium botulinum* type E are sensitive to sodium chloride at certain stages of germination and vegetative cell development. Furthermore, the formation of toxin in substrates containing certain levels of NaCl is partially or completely inhibited. This article reports on the effect of NaCl concentration on the growth and toxinogenesis of *C. botulinum* type E strains Minnesota, Saratoga, and Tennessee in heat-processed homogenates of Pacific cod (*Gadus macrocephalus*) muscle. The homogenated muscle of the cod was inoculated with heat activated spores and incubated anaerobically at 30° C.

The Minnesota strain of *C. botulinum* type E produced a maximum toxin titer of MLD/g. (MLD = minimal lethal dose) in the control homogenates (cod muscle samples without added NaCl), and a salt concentration of 3.76% (salt level in the aqueous phase) inhibited the formation of toxin in the homogenates, but did not inhibit outgrowth (defined as all stages involved in vegetative cell development subsequent to spore germination) and vegetative cell multiplication. The Saratoga strain produced a maximum titer of 75 MLD in control samples, and growth occurred in homogenates having a 3.84% NaCl content (in the aqueous phase) without the formation of toxin. The Tennessee strain formed a maximum titer of 1,000 MLD in control homogenates, and toxin of low potency was formed in the homogenates containing 4.40% salt (aqueous phase). The homogenates containing 5.50% salt (in

(over)



0.38 CARBOXY-TERMINAL REGION OF STURGEON MUSCLE ALDOOLASE (1.9)  
Anderson, Paul J. (Lab. Chim. Proteines, Cent. Hosp. Univ., Sherbrooke, Quebec, Canada)  
Chemical Abstracts 75, No. 15, 94949q (October 11, 1971)

ALP [references 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

(1961 August) 5121-8021 '8 'No. 53  
Yoshida, Minoru, Haruhisa Ikumo, and Osamu Suzuki (National Institute of Animal Industry, Chiba-shi and Prefectural Animal Husbandry Experiment Station, Japan)  
Agricultural and Biological Chemistry 36, 1001-1006 (1961)

0.5 MONITORING OF LOW-LEVEL VIRUS IN NATURAL WATERS (9.19)  
Sorber, Charles A., Bernard P. Sagik, and Joseph F. Malina, Jr. (Environmental Health Engineering Laboratories, and the Department of Microbiology, University of Texas, Austin, Tex. 78712)  
Applied Microbiology 22, No. 3, 334-338 (September 1971)

The insoluble polyelectrolyte technique [C. Wallis, S. Grinstein, J. L. Melnick, and J. E. Fields, Applied Microbiology 18, 1007-1014 (1969) and S. Grinstein, J. L. Melnick, and C. Wallis, Bull. W. H. O. 42, 291-296 (1970)] was used to concentrate extremely low levels of virus. A coliphage T2 model (rather than enteric viruses) was used in this investigation. Phosphate-buffered saline at pH 7.2 or natural surface water was used in the tests. Using the coliphage T2 model, the recovery of T2 was a constant 20% over levels of virus from 10<sup>3</sup> to 10<sup>-4</sup> plaque-forming units/ml. Critical control of pH is necessary for an efficient recovery. The authors suggest that the method described is useful for quantitating the effectiveness of water and waste water treatment methods for the removal of viruses from waters at low concentrations; in addition, it may be a suitable technique for monitoring of natural waters for low levels of viruses.

FTF [2 tables, 81 references]  
The aqueous phase was sporadic to the Saratoga and Tennessee strains, but was not sporadic to the Minnesota strain. Subcultures, prepared from homogenates in which growth was inhibited, produced toxin.

0.33 BROWNING OF FOODS BY MICROORGANISMS. I. BROWNING OF FISH JELLY PRODUCTS (6.54) (2.01)  
Ogawa, Hiromochi, Masami Onagi, and Kiyoshi Fukushima (Ajinomoto Co., Inc., Kawasaki, Japan)  
Chemical Abstracts 74, No. 23, 121595j (June 7, 1971)

II. Effects of Carbohydrates, Proteins, and Amino Acids on Browning. Ibid. 121596k.  
[references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

(1961 November) 626-916 '2 'No. 801  
D'Aoust, Y. J., J. J. Kushner, and D. D. J. J. (University of Ottawa, Ottawa, Ontario, Canada)  
Journal of Bacteriology 126, 1001-1006 (1961)

BT [references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346,



0.6 DEVELOPMENT OF LEAF PROTEIN CONCENTRATES I. (0.321)

Choe, Sang, Geon Chee Kim, Myung HI Chun, and Kil Hwan Kim  
Kor. J. Food Sci. Technol. 2, 8-16 (1970)  
Korean Scientific Abstracts 3, No. 2, Abstract No. 71/230, 62-63 (30-31) (April 1971)

Exploitation of leaf protein concentrates for human consumption is very important. Leaf protein concentrates can be easily prepared by mechanically mincing leaf material and pressing out the juice. Crude protein can be separated from the juice by aging, adjusting the pH, or heating to 75°-80° C. This report deals with the extractability of total-N from 69 species of fresh leaves by mechanical processing; it then compares the amount of leaf protein concentrates recovered by treating leaf extracts with TCA (trichloroacetic acid) by adjusting the pH, and by heating. Results are summarized as follows.

1. In general, the greater the content of total-N of leaves the greater the percentage of extraction. Extraction of the juice from leaves is needed at least two times. Two simple equations express the relation between the total-N (T in %) and the first and second extractability (E1 and E2 in %) of the total-N of leaves, as follows:

$$E_1 = 0.8168T$$
$$E_2 = 0.1830T$$

2. The optimum pH for coagulating protein from extracts is from 3.5 to 4.5. However, leaf protein concentrate produced by the pH adjustment of extracts is generally dull in color and quite rubbery.

(over)

0.9 FOOD PROCESSING REVIEWS (9.6)

Noyes Data Corporation, 35 pp. (December 1971) (publishers) Noyes Building, Park Ridge, N.J. 07656

"Seafood Processing 1971," by M. Gillies, Food Processing Review No. 22, 206 pp. (1971) Price \$36.

This book describes 84 processes [13 on preservation, 11 on canning processes, 14 on protein concentrates, 18 on mollusks and shellfish, 17 on consumer products, and 11 on animal foods] based on U.S. patents issued since 1960.

"Enzymes in Food Processing and Products 1972," by H. Wieland, Food Processing Review No. 23, 260 pp. (December 1971) Price \$36.

This book covers 101 processes relative to fruit and vegetable processing, starch and sugar conversion, baked goods applications, cheese-making, meat tenderization, special applications (including 2 processes on fish protein concentrates), flavors by means of enzymes, deoxygenating and desugaring and enzyme stabilization.

FTP

Pravdina, K. I. (Lab. Comp. Cytol., Inst. Cytol., Leningrad, U.S.S.R.)  
Chemical Abstracts 74, No. 21, 108659p (May 24, 1971)

0.38  
HEAT STABILITY OF WATER-SOLUBLE ESTERASES  
OF POIKILOTHERMIC ANIMALS  
(9.13)

0.7 IRON DEFICIENCY LIPEMIA IN THE RAT AND CHICK

Amine, Ezzat K., and D. M. Hegsted (Department of Nutrition, Harvard School of Public Health, Boston, Mass. 02115)  
Journal of Nutrition 101, No. 11, 1575-1582 (November 1971)

In earlier studies on iron utilization and metabolism the authors and co-workers found that a marked lipemia occurred in iron-deficient rats and chicks. In the present study, they examined the effect of chronic iron deficiency on blood lipids of male and female rats, including the effects produced by altering dietary fats and protein. They also studied the effect of severe iron deficiency on growth, organ weights, and blood lipids of the chick.

Severe iron deficiency was produced in male and female rats by feeding them diets low in iron. Two different diets were fed over a 5-week period. The rats developed a lipemia characterized by a marked rise in the levels of plasma triglycerides. The levels of plasma cholesterol and plasma phospholipid were either depressed or were relatively unchanged. After 1 week on an iron supplementation diet, the rats showed a significant reduction in plasma triglyceride levels accompanied by an increase in hemoglobin, hematocrit, cholesterol, and phospholipids. The triglyceridemia associated with anemia is dependent upon the kind and amount of fat in the diet and upon the protein level. The severely iron-deficient chicks also showed a marked rise in serum triglyceride levels and some elevation of plasma cholesterol and phospholipid levels. The lipemia was associated with a significant rise in the total plasma proteins (primarily albumin) and a moderate accumulation of fat in the livers.

[7 tables, 28 references]

FTP

0.7 THE NUTRITIVE VALUE OF SINGLE FOODS (3.3) (1.120)

Williams, Roger J., James D. Heffley, and Charles W. Bode (Clayton Foundation Biochemical Institute and Department of Chemistry, The University of Texas at Austin, Austin, Tex. 78712)

Proceedings of the National Academy of Sciences of the U.S.A. 68, No. 10, 2361-2364 (October 1971)

In an earlier test, the authors found that commercial "enriched" bread alone would not support life in weanling rats over the span of the test, 90 days. However, if the bread were supplemented with small amounts of vitamins, minerals, and lysine (at a cost of a fraction of a cent a loaf), not only would the rats live, they would grow seven times as fast as the rats on the unsupplemented "enriched" bread. The report of these tests was criticized by nutritionists, who contended that bread is not eaten alone and that any other single food would also be nutritionally deficient.

To examine the validity of the criticism, the authors fed groups of male rats, 12 to a group, exclusively on one of the following human foods, one food to a group: pasteurized vitamin D whole milk; hamburger meat cooked 20 min. at 35° F.; all-meat, precooked, commercial frankfurters; fresh eggs steamed 10 min. in a shallow pan; canned tuna fish; commercially roasted peanuts; shredded-wheat breakfast cereal; wheat flakes breakfast cereal, commercially "enriched" with thiamin, niacin, and iron"; puffed rice breakfast cereal, commercially "enriched" with thiamin, niacin, riboflavin, and iron." For comparison, they also fed groups of rats exclusively on one of the following: shredded wheat, "enriched" wheat

(over)



0.6 (0.7) RATIONALE AND TECHNOLOGY OF FOOD FORTIFICATION WITH VITAMINS, MINERALS AND AMINO ACIDS

Borenstein, Benjamin (Roche Chemical Division, Hoffman-La Roche, Nutley, N.J.)  
 CRC Critical Reviews in Food Technology 2, No. 2, 171-186 (July 1971)

Following a discussion of the philosophy, the established criteria, and the general nutritional considerations of fortification, the author reviews a variety of viewpoints on the technology of adding various vitamins, minerals, and amino acids to foods. [4 tables, 48 references]

LB

Among the books listed is Evaluating the Safety of Food Chemicals, 55 pp. (1971)

By the Subcommittee on Toxicology (Julius M. Coon, chairman), Food Protection Committee, Food and Nutrition Board, National Research Council

The book is available for \$2.50 from the Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Avenue N.W., Washington, D.C. 20418. LB

0.6 (9.6) BOOKS OF INTEREST TO PATHOLOGISTS

Anonymous Laboratory Investigation 25, No. 2, 196 (August 1971)

(123.0) 9.0

3. The yield of leaf protein concentrates decreased about 10% with heat treatment compared with the yield given by TCA treatment.

4. The heat treatment is the most beneficial method for the production of leaf protein concentrates with regard to properties of texture, color, and yield of products and easiness of the treatment method.

Extractor: LB

[3 figures, 3 tables, 15 references]

Isolation and identification of the volatile components are a common characteristic of the investigational techniques used on all four main categories of food: meats, fruits, cereals, and vegetables. However, correlation with organoleptic analysis is often lacking. As food shortages become more acute, new flavorful foods will have to be created; even those foods that are now proposed as partial solutions to the world hunger problem (artificially grown yeasts and fish protein concentrates, for example) will need flavor and other additives if they are to become acceptable to a broad spectrum of consumers. The main goal for flavor research should be to bring to light information that will help in the duplication of desirable food flavors.

LB

0.6 A REVIEW OF THE LITERATURE CONCERNED WITH FLAVOR RESEARCH AS IT APPLIES TO THE PROBLEMS OF THE FLAVOR INDUSTRY

Eiserle, Robert J., and William J. Downey (Fritzsche Dodge & Olcott Inc., New York, N.Y.)

CRC Critical Reviews in Food Technology 2, No. 2, 159-169 (July 1971)

Isolation and identification of the volatile components are a common characteristic of the investigational techniques used on all four main categories of food: meats, fruits, cereals, and vegetables. However, correlation with organoleptic analysis is often lacking. As food shortages become more acute, new flavorful foods will have to be created; even those foods that are now proposed as partial solutions to the world hunger problem (artificially grown yeasts and fish protein concentrates, for example) will need flavor and other additives if they are to become acceptable to a broad spectrum of consumers. The main goal for flavor research should be to bring to light information that will help in the duplication of desirable food flavors.

0.7 (3.3) (1.120)

flakes, "enriched" puffed rice, and "enriched" macaroni, each supplemented as in the previous bread experiment--that is, with 2 mg. pyridoxine, 4.5 mg. pantothenate, 2.2 µg. cobalamine, 2160 U vitamin A, 20 mg. vitamin E, 0.5 mg. folic acid, 0.5 g. L-lysine, 300 mg. calcium, 713 mg. phosphate, 150 mg. magnesium (oxide), 20 mg. manganese (sulfate), and 4 mg. copper (sulfate) per pound.

Eggs alone proved to be an exceptionally good food throughout the test period, apparently having no deficiencies whatever. Milk was almost as good; however, after about 2 mo., the deficiency of iron and copper became evident and an iron-copper supplement was added to the diet. Hamburger meat, frankfurters, and tuna fish, while not in the same class with eggs, gave good results for 40 or 50 days, after which the rats began to lose weight. The supplemented "enriched" wheat products gave moderately good results, but the supplemented "enriched" puffed rice gave results little better than those given by the remaining foods tested--at no time showing any promise of sustaining growth even remotely approaching normal.

The authors draw four conclusions from these test results. (1) When tested alone, individual staple foods differ markedly in their food value. (2) Like "enriched" bread, many cereal products can be vastly improved at small cost. (3) The usual tables giving the composition of foods are wholly inadequate for evaluating foods. For example, food composition tables show that "enriched" puffed rice is only slightly inferior nutritionally to eggs. These tests show that such nutritional comparisons can be grossly in error. (4) Biological testing will give the information needed to answer such previously unanswered questions as: How does food A (which may be any vegetable, cereal, or meat) compare nutritionally with that same food grown under different conditions? Or derived from a closely related species? Or processed in a different way? Or preserved in a different manner? Or without additives? [5 figures, 2 references] LB

0.9 MERCURY IN A GREENLAND ICE SHEET: EVIDENCE OF RECENT INPUT BY MAN (9.19)

Weiss, Herbert V. (Naval Undersea Research and Development Center, San Diego, Calif. 92132), Minoru Koide, and Edward D. Goldberg (Scripps Institution of Oceanography, University of California, San Diego, La Jolla, Calif. 92037)  
 Science 174, No. 4010, 692-694 (November 12, 1971)

Permanent snowfields record the introduction of matter into the atmosphere; the ices contain in unchanged condition the water and the accumulated solids that precipitate from the air as a function of time. Influences regarding the chemical composition of the atmosphere as it existed centuries ago can be drawn through the analysis of these ices.

The authors found that the mercury content in a Greenland ice sheet has increased (about double) over the last several decades. They suggest that this increased content of mercury in glacial snows in recent years is a reflection of man's impact on the environment. The mercury in the atmosphere probably arises from the degassing of the earth's crust; increased atmospheric burden of mercury may come about as a result of the enhancement of this degassing process through the action of man.

The authors conclude that the recently measured mercury concentrations in pelagic fish (such as tuna and swordfish) are probably not far removed from the norm. The input of about twice as much mercury to the surface waters of the ocean can only increase the amount of mercury in the lower trophic levels by, at best, a factor of 2. Or, the increased mercury content in surface waters of the ocean (about double), if transmitted through the food web to upper trophic levels (as those of the swordfish and tuna), would, at best, double the mercury content of these organisms. [1 table, 11 references]

ftp



1.69  
(9.12)

ON THE ORIENTATION OF THE PLAICE (PLEURONECTES PLATESSA L.)  
I. EVIDENCE FOR ORIENTATING FACTORS DERIVED FROM THE ICES  
TRANSPLANTATION EXPERIMENTS IN THE YEARS 1904-1909

De Veen, J. F. (Rijksinstituut voor Visserijonderzoek, IJmuiden, Netherlands)  
Journal de Conseil du International Pour L'Exploration de la Mer 33, No. 2, 192-227  
(1970)

Re-examination of the original data of the ICES [International Council for the Exploration of the Sea] displacement experiments carried out in the first decade of this century showed that plaice return towards the initial ground, even when displaced over considerable distances to unfamiliar territory.

The speed of homing is low and the majority of the transplanted fish never returns exactly to the ground where they were caught. After one year the cluster of transplanted fish, as a whole, has reached a position between the catch and the release position. No further gain in homing was achieved in the second year after release, the cluster of displaced fish after two years more or less coinciding with the position reached after one year. Plaice displaced over a distance of 190 miles or more only showed a homing tendency in the first two months after release.

A number of displacement experiments showed that recruits were not guided by the residual bottom currents when selecting their spawning grounds. Adult plaice, revisiting their spawning grounds, did not use the currents as directional clues for migration. [18 figures, 4 tables, 51 references]

Author's abstract

1.951  
(2.1129)

FORSKRIFTENE FOR AVLIVING AV SEL VURDERT ETTER ELEKTROGRAFSK  
REGISTRERING AV HJERNE- OG HJERTEAKTIVITET  
[CURRENT REGULATIONS FOR KILLING OF SEALS EVALUATED  
BY ELECTROGRAPHIC RECORDINGS OF BRAIN AND HEART ACTIVITY]

Blix, Arnoldus Schytte, and Nils Are Øritsland (Zoofysiologisk institutt, Universitetet i Oslo)  
Fisken og Havet No. 2, 39-40 (1970) (In Norwegian; figures and summary in English)

To evaluate both the weapons and the methods of killing prescribed by Norwegian sealing regulations, the authors recorded changes in brain and heart activity during the seal-slaughtering procedure. Three blueback seals (Cystophora cristata) were struck on the head with a "blowhook" (a 50-cm.-long club fitted with an 800-g. steel hook); immediately after the blow, the blood vessels to the forelimbs of one seal were cut. Heart activity in the two that were struck only continued for 30 and for 56 min.; in the seal that was bled, it continued for 45 min. Brain activity and somatic reflexes in all three ceased immediately after the blow.

18

Chemical Abstracts 75, No. 5, 34156u (August 2, 1971)

Alur, M. D., N. F. Lewis, and U. S. Kunte (Biochem. Food Technol. Div., Bhabha At. Res. Cent., Bombay, India)

SPOILAGE POTENTIAL OF PREDOMINANT ORGANISMS AND  
RADIATION SURVIVORS IN FISHERY PRODUCTS

2.01  
(3.15)

2.0

DEGRADATION OF INOSINE 5'-MONOPHOSPHATE IN THE SKELETAL MUSCLE  
OF SEVERAL NORTH ATLANTIC FISHES







Dingle, J. R., and J. A. Hines (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 28, No. 8, 1125-1131 (August 1971)

Previous workers found that inosine 5'-monophosphate (IMP) can enhance the flavor of meat products. Studies on the formation and breakdown of IMP in muscle tissues used for food have shown that the rate of breakdown in various species of fish may vary from one species to another. The present workers confirmed this observation; they found that the rates of breakdown of IMP, and of its product inosine (Ino), varied considerably in the muscles of Atlantic cod, haddock, pollock, Atlantic halibut, American plaice, and winter flounder when the fish were stored in ice. The haddock and Atlantic cod muscle showed very slow rate of breakdown of IMP in comparison to that of the muscle of the other species of fish. Winter flounder showed variations of the rate of dephosphorylation of IMP among individual samples; this variation appears to be due to differences in pH of the muscle. The maximum rates of breakdown of IMP took place in the pH range of from 8.6 to 9.4, and were much greater than in the pH range of muscle. The pH had less effect on the breakdown of Ino in comparison to the effect on breakdown of IMP. Muscle of haddock and Atlantic halibut cooked at 260° or 100° C. showed little or no loss of endogenous IMP. Also, IMP added to Atlantic cod was stable during cooking of the muscle. [5 figures, 2 tables, 25 references]

FTP

2.110  
Foster, J. J.  
World Fishing 20, No. 10, 12-14, 20 (October 1971)

GEAR STUDIES AT ABERDEEN LABORATORY

Type of otter board	Relative spreading force per unit area
Flat	
Cambered	
Hong Kong diverter	
Polyvalent	
V-form	
Suberkub	

Note: Crosshatched line, spreading force in midwater;  
hatched line, spreading force on the bottom.

The principal gear and fish behavior factors that govern the efficiency of fishing operations are discussed. One of the factors covered in some detail is the effect of different amounts of curvature on the spreading force of midwater and bottom-running otter boards. Practical tests show that the recently introduced polyvalent board has the (over)



Øritsland, Nels Are (Zoofisiologisk institutt, Universitetet i Oslo)  
Fisken og Havet No. 2, 20-22 (1970) (In Norwegian; figures and summary in English)  
(Institute of Marine Research, Bergen, Norway)

When the pelt of harp seals absorbs solar radiation, it acts as a heat trap, reflecting the radiation through the layers of hair and absorbing it in the epidermis. Outward heat flow by conduction, convection, and radiation is poor. At a skin temperature of 45° C., the hairs loosen from the follicles; at 50° C., the epidermal layers, including stratum corneum and possibly the peripheral parts of stratum lucidum, loosen from the nether layers. The effectivity of the heat trap seems to depend on the color and morphology of the hair. Because of these characteristics, iceburns may affect harp seals even on cold, windy days when the sun is low. Living seals avoid lethal skin temperatures in areas exposed to the sun by increasing their blood circulation.

[2 figures, 4 references]

FTF Peeled shrimp are conveyed through a steam cooker between two endless conveyor belts.

Food Technology 25, No. 9, 64 (September 1971)

2.3 SHRIMP PROCESSING  
(1.85)

THE RAINBOW TROUT OF LAKE TITICACA AND THE FISHERIES OF LAKE TITICACA (1310'1)  
63'1

Everett, George V. (Milford-on-Sea, Lymington, Hampshire, England)  
Report to the Government of the Republic of Peru, vi + 180 pp. (April 1971)

Part I of this document is the text of the thesis. Part II includes additional information of use in comprehending the Titicaca fisheries. Part III consists of Tables and Figures.

In the thesis I attempted, firstly, to analyse the data with methods normally used in assessment of fish stocks and, secondly, to consider the rainbow trout of Lake Titicaca in the context of the biology and life history of rainbow trout in other parts of the world. Much of the data were taken from commercial fishing records. [56 figures, 89 tables, 43 references]

LB A general view of the region--its inhabitants, their ethnic and political history, its marine features, and its exploitable fishery resources.  
[1 map]

1.0119 THE POTENTIAL FOR FISHERY DEVELOPMENT IN THE CARIBBEAN AND ADJACENT SEAS

Idyll, Clarence P. (Division of Fisheries and Applied Estuarine Ecology, University of Miami, Fla.)

University of Rhode Island Marine Bulletin No. 1, 16 pp. (n.d.) (University of Rhode Island International Center for Marine Resource Development, Kingston, R.I.)

2.110

very same spreading efficiency predicted by the theoretical work. Because of their oval shape, they do not dig into the bottom as readily as do other types. Practical tests also confirm theoretical predictions for another recently introduced spreading device, the Hong Kong diverter. During shooting operations, they were found to be very stable--the ship could even be stopped temporarily and they would remain submerged in the upright position hung on the end of the short warps. However, the solid spherical appendages hanging from their lower edge require that the stowing and handling procedures normally followed during commercial fishing be modified. Results of studies on the possible application of powered rotating cylinders to replace traditional midwater trawl boards are summarized.

Since the catching capacity of a trawl is not simply a function of its size, various rigging configurations in front of the net, various groundrope compositions, and various net designs are examined. The tendency of larger nets to induce gear instability during towing, the pulsing movement of the trawl net and the boards during the tow, and the vibrational characteristics of the warps and their dependence on the vibration of the rest of the gear are noted. Studies on these factors have been correlated with those on the reaction of fish to noise generated by the gear, on the ability of fish to detect the direction of sound sources, and on other behavioral characteristics associated with the hearing of fish. One interesting observation was made during studies on the effect of using large meshes in the forward part of the net: fish make no effort to escape through these meshes as long as the pattern of the netting is uniform. But if a mesh is broken or if the pattern is in some way discontinuous, the fish will readily escape. [3 figures]

LB

2.11 RELATIVE COST OF SHIPBUILDING. A REPORT TO THE CONGRESS ON THE RELATIVE COST OF SHIPBUILDING IN THE VARIOUS COASTAL DISTRICTS OF THE UNITED STATES

Anonymous

Annual Report 1970-1971, 58 pp. (June 1971) MA-STAT-722-72-02. (Maritime Administration, Washington, D.C.) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. COM-71-50261. Paper copy \$0.50.

Government Research Announcements 71, No. 18, 178 (September 25, 1971)

The report shows that the cost of shipbuilding is about 4½ percent higher on the West Coast than on the East Coast and that the costs are about 2½ to 3 percent lower on the Gulf Coast and Great Lakes than on the East Coast. The report concludes however, that despite certain geographical disadvantages, shipyard competition does exist on an equalized basis and no remedies to equalize costs between the coastal districts are justified at this time. (Author)

Reprinted

LB The echo integrator, its circuitry and controls, and its application are described. Relative densities obtained from records given by the echo sounder and the echo integrator are compared. [4 figures, 1 table, 12 references]

English) Nakkem, Odd, and Gudmund Vestnes (Fiskeridirektoratets Havforskningsinstitutt) Fisken og Havet No. 2, 41-45 (1970) (In Norwegian; figures, table, and summary in English)

2.116 EKOINTEGRATOREN. ET APPARAT FOR Å MÅLE FISKETETTHET [THE ECHO INTEGRATOR. AN APPARATUS FOR MEASURING FISH DENSITY]



2.119 ON THE FISHING POWER OF DUTCH BEAM TRAWLERS  
(0.8)

De Boer, E. J. (Technical Research Department of the Fisheries Directorate, IJmuiden, Holland), and J. F. de Veen (Netherlands Research Institute, IJmuiden, Holland)  
International Council for the Exploration of the Sea, Special Meeting on "Measurement of Fishing Effort" C.M. No. 11, 4 pp. (1970)

Since 1962, about 75% of the Dutch trawler fleet has been equipped for beam trawling. Engine power on trawlers fishing for sole range from 350 to 1,000 b.hp. Although engine power is an important parameter in calculations of relative fishing power, from 60 to 66% of the relation fishing power: ship's parameter is unaccounted for. By using thrust--that is, delivered power at the propeller--under actual fishing conditions and taking propeller efficiency into account, the values for the correlation coefficients can be significantly improved.

Thrust is calculated from the formula  $T = K_T \times Q \times n^2 \times D^4$  where T is thrust,  $K_T$  is the thrust constant (determined from the propeller diagrams of the given propeller, fishing at 4 knots), Q is the mass density of sea water, n is the revolutions per second, and D is the diameter of the propeller. Calculations of the correlation coefficients between mean annual catch per unit effort (a), brake horsepower (b), and thrust (c) for two n values gave the following results:

$$\text{with } n = 10, r_{a,b} = 0.633 \text{ and } r_{a,c} = 0.814;$$

$$\text{with } n = 16, r_{a,b} = 0.582 \text{ and } r_{a,c} = 0.745.$$

The authors believe that calculations for separate species (rather than for the total catch, as was done here) will reduce even further the unexplained part (34)  
(over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 2 PAGE 9

2.1121 REPORT ON THE DEVELOPMENT OF AN ELECTRIFIED SHRIMP-TRAWL  
(2.143)  
(1.85) (2.12)

Boonstra, G. P., and S. J. de Groot (Technical Research Department, Netherlands Institute for Fishery Investigations, IJmuiden, The Netherlands)  
International Council for the Exploration of the Sea, Gear and Behaviour Committee C.M. B:5, 6 pp. (1970)

The commercially important species of shrimp fished for by the Dutch is the European brown shrimp (*Crangon crangon* (L.)), a much smaller species than either the American brown (*Penaeus aztecus* Ives) or the American pink (*P. duorarum* Burkenroad). Because of the turbid waters along the Dutch coast, they are caught during the day as well as at night. However, during the winter, when the water is clear, and in the deeper waters of the North Sea, where Dutch shrimp fishermen are beginning to fish of late, day-time catches are poor. The need to extend the fishery to a 24-hour operation and to reduce destruction caused by the heavy shrimp-trawl gear on immature flat fish, such as sole and plaice, motivated the experiments reported here.

Using the electrified trawl they reported on in C.M. 1970/B:4, the authors conducted a series of experiments in a former oyster basin in the Scheldt estuary and from a commercial vessel fishing on shrimp grounds. In clearer waters, the commercial catches with the electrified trawl were 50% higher than those with a nonelectrified trawl. However, in very turbid waters, catches with the electrified trawl were no better--and sometimes even poorer--than those with the regular trawl. The authors account for this result by noting that the jump of shrimp

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 2 PAGE 9

2.112 PRELIMINARY NOTES ON THE DEVELOPMENT OF AN ELECTRICAL TICKLER CHAIN FOR SOLE (*SOLEA SOLEA* L.)  
(2.143) (1.69)

De Groot, S. J., and G. P. Boonstra (Netherlands Institute for Fishery Investigations, Technical Research Department, IJmuiden, The Netherlands)  
International Council for the Exploration of the Sea, Gear and Behaviour Committee C.M. B:4, 4 pp. (1970)

The Dutch fish for sole, their most important commercial species, with double-rigged beam trawls and tickler chains. Owing to the increasing use of more powerful engines (800 hp. is common), trawlers are now towing heavier chains--as much as 2,000 kg. of chain in front of each ground rope. The increase in the weight of the chains has led to an increase in the damage done to immature fish. The aim of the investigation reported here was to examine the possibility of replacing the heavy chains with light, electrical ticklers. Simultaneously, the behavior of soles to electrical stimuli in a temperature range of 6° to 20° C. was studied.

The tickler consisted of an electrode array mounted in a 2- by 2-M. frame. The six electrodes were alternately positive and negative, and were spaced 35 cm. apart. The pulse generator produced pulses of capacitor discharge shape during trials in 100 x 90 x 60 cm. tanks in the laboratory; however, probably due to the length of the 50-m. cables from the generator to the electrodes, the pulse produced during trials in a former oyster basin in the Scheldt estuary was nearer a quarter sine shape. Hence the pulse length could not be properly established. The pulse frequency could be regulated continuously between 1 and 50 i.p.s.; the pulse cycle could be interrupted in a frequency of  $\frac{1}{4}$  to 10 Hz. Peak voltage could be regulated in steps between 2.5 and 60 v. Total capacity of the discharge capacitors

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 2 PAGE 9

2.1121 THE HEAVY TICKLER CHAIN -- RIGHT OR WRONG?  
Anonymous  
World Fishing 20, No. 10, 8-10 (October 1971)

Dutch and Belgian beam trawls are equipped with from 6 to 16 heavy tickler chains weighing a total of up to 3.5 tons. The chains are rigged in a network stretching from a point level with the headrope to the groundrope. To pull this rig, the power of the engines has been steadily increased, a 900-horsepower engine for a 25-meter cutter no longer being uncommon. The efficiency of the gear is untested. (The Dutch figure that these trawls are nearly five times as efficient as are other trawls at catching sole.) But the damage it does to stocks, to young fish that escape the net, to gear subsequently fishing the grounds cluttered with the boulders it drags out of the seabed and leaves on the bottom, and to bottom fauna that is likewise disturbed has yet to be objectively assessed. This article gives the personal views of English, Dutch, Belgian, Scotch, Danish, and French fisheries research scientists on the effects of this gear.

With one exception, the scientists seem to believe that the gear should be controlled rather than banned, for failure to adopt more efficient fishing techniques means economic suicide. Use of the heavy ticklers may make stony grounds unworkable by conventional trawls, but on sandy or muddy grounds, no material interference with normal bottom trawling is evident. Observations during the 15 years that the Dutch have used the gear have so far indicated only superficial damage to fish that are caught (this damage is removed during skinning) and no appreciable damage to young fish (as reflected by the absence of any recorded decline

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 2 PAGE 9



Otsuka, Shigeru (Tokyo Junior Coll. Food. Technol., Japan)  
 Chemical Abstracts 75, No. 15, 97297m (October 11, 1971)

2.12 (2.1121) (2.143) (1.69)

was 9520  $\mu\text{f.}$ , regulatable in steps- $2 \times 34$ ,  $9 \times 68$ , and  $13 \times 680 \mu\text{f.}$

Results of trials in the laboratory were confirmed by results in the estuary. The "omega-jump" (Kruuk, 1963) of the sole could be induced by a voltage of no greater than 8 v., a pulse repetition rate of from 40 to 50 per sec., an interrupted pulse cycle of about  $\frac{1}{2}$  Hz., and a pulse length of about 0.7 msec. (about 0.2 msec. in the estuary). In actual commercial fishing, the electrical stimulus could probably be continuous, for, with a moving net, the electrodes' passing over the fish would provide the needed interruption. If electrodes strong enough to withstand the constant chafing from the bottom cannot be kept light, they might be rigged across the ground rope, running from the beam to the ground rope. In this situation, the pulse cycle would have to be interrupted to evoke the omega jump.

Temperature had no effect on the reaction of the sole to electrical stimuli. Trials of the electrical tickler on plaice, flounder, dab, and brill showed that these flatfish will not respond to an electrical stimulus, probably because their body musculature is different from that of sole.

[2 tables, 3 references]

LB

in the stock over this period). Disturbance of bottom-dwelling animals may actually benefit the fishery. Many fish follow the trawls just as gulls follow the plow, eating the animals that are turned up by the scraping action; the result is faster growing fish, since they do not have to spend energy seeking food in the normal way.

The one dissenting voice is that of M. Bonnet, head of the French fisheries laboratory at Sète. He believes that the heavy ticklers as they are now rigged upset the natural balance of marine animal and vegetable life and should, therefore, be banned. If chains are used either to keep the ground rope down or to stimulate fish, they should be either wound around the ground rope, trailed from it in small loops, or suspended in such a way that they don't dig into the bottom. The possibility of Dutch and Belgian fishermen accepting this less effective way of fishing is extremely remote. Yet some limiting factor should be imposed to contain the situation until enough facts are available to form the basis for internationally agreed action. An immediate limit on chain size, chain weight, engine horsepower, or number of vessels licensed to use the gear would decelerate the downward trend of catch rates and give some comfort to those critics who fear the stock will simply be researched until it disappears.

[3 figures] LB

Shekhtman, A. N.  
Trans. of Nauchno-Issledovatel'skii Institut Aeroklimatologii, Moscow Trudy (USSR)

Rept nos. NSTC-C-29541, NSTIC-Irans-2311, 22 pp. (March 1971) (Naval Scientific and Technical Information Centre, Operations Division, Springfield, Va. 22151.  
Order No. AD-723 591. PC\$3.00; MF\$0.95.  
Government Research Announcements 71, No 13, 24 (July 10, 1971)

A survey is given of literature about the icing-up of vessels and the results of a summary of several hundred factors concerning this dangerous occurrence and the accompanying hydrometeorological conditions. The circumstances of icing-up are defined more accurately, and recommendations for the further study of hydrometeorological factors which influence the icing-up of vessels are given. (Author)

Reprinted

[2 tables, 3 references]

and 44.5%, respectively) of the relation. They plan to test this hypothesis by calculating the relative fishing power, separately, of the beam trawler fleet as it fishes for sole, plaice and turbot on different fishing grounds during differ-

2.119 (0.8)

Kostyunin, Yu. N.

Trans. of mon. Rybolovnye Traly, Moscow, 175 pp. (1966) by M. Ben Yami  
Special Foreign Currency Science Information Program, 153 pp. (1971) Available  
from the National Technical Information Service, Operations Division, Spring-  
field, Va. 22151. Order No. TT-70-54024, PC\$3.00; MF\$0.95.  
Government Research Announcements 71, No. 16, 89 (August 25, 1971)

The book examines the problems involved in the construction of bottom and midwater trawls, and describes details in their equipment and rigging, as well as the particular design of some types of trawls. There is a brief description of trawlers and their fishing deck machinery. Problems involved in the technique of bottom and midwater trawling operations, mishaps, breakdowns, and their preventive means are described in detail. (Author) Reprinted

Reprinted

ported by U.S. gear researchers. [1 diagram, 1 table, 8 references] LB

already out of the sand will actually help them escape the electrified trawl, the electric field of which extends in front of the ground rope and warns them of approaching danger sooner than does the ground rope of the nonelectric trawl. Other results (the shrimp's reaction to electricity, the optimum pulse length of 0.2

 $2.1121 \quad (2.143)(1.85)$



Burgess, John  
Fishing News, No. 2984, 9 (August 21, 1970)

Voisin, Charles J., Sr. (Star Route, Box 200, Theriot, La. 70397) (pat.)  
U.S. Patent 3,608,217 (September 28, 1971)

The British White Fish Authority has recently issued a bulletin (No. 36) reporting the results of investigations into the propulsion requirements of fishing vessels of different sizes and types. It covers such questions about propeller sizes and types (fixed blade or controllable pitch) as what considerations have to be taken into account during selection of a suitable propeller or fitting a nozzle, and what effect choice of engine power has on the vessel. If Bulletin No. 36 does not provide all the information he might need, the reader is invited to write for further details to the White Fish Authority, Industrial Development Unit, Saint Andrew's Dock, Hull, England.

The oyster dredge itself, which is in most respects of fairly conventional configuration, is only one element of this dredging system. Other elements include a hoisting and dumping structure and a relaunching arrangement. When the basket part of the dredge has scooped up a load of oysters, the operator reels the dredge in by winch over a conventional drum. As the dredge is pulled further inboard, pivot pins at the mouth of the basket are engaged by arms on the dumping structure; continued reeling in causes the basket to tip, mouth down, and dump the oysters on the deck. When the operator releases tension by releasing the winch, the basket is snapped back into position by springs, and the pivotally mounted, spring-loaded arms move the dredge outboard for relaunching; when the arms return to their oyster-dredge-engaging position, gravity causes the dredge to return to the ocean bottom.

The author of this article also noted how often, in publications of this sort, horsepower is being expressed in watts and kilowatts, with the equivalent horsepower alongside in brackets. He speculates that before long the information in brackets may be dropped, just as the Fahrenheit equivalent is being omitted alongside degrees Centigrade or Celsius in some weather forecasts. Also, when crans of herring are expressed in liters and kits in kilograms, many fishermen will need the conversion tables contained in Torry Advisory Note No. 40. The Note, titled "Going Metric in the Fish Industry," was compiled by J. Templeton to provide information about the system of metric units now coming rapidly into international use. It is available free from The Director, Torry Research Station, P.O. Box 31, 135 Abbey Road, Aberdeen, Scotland.

This ready-to-cook product consists of a pair of fish filets forming an enclosure for stuffing material.

Joaquin, J.; Rupert Fish Co. Inc. (pat.)  
Canadian Patent 869,948  
Food Technology 25, No. 9, 64 (September 1971)

2.1476 NET AVOIDANCE BEHAVIOR IN AMERICAN SHAD (ALOSA SAPIDISSIMA) AS OBSERVED BY ULTRASONIC TRACKING TECHNIQUES

2.1128 HISTORY AND DEVELOPMENT OF SURF CLAM HARVESTING GEAR

Leggett, William C. (Essex Marine Laboratory, Essex, Conn. 06426), and Robert A. Jones (Connecticut State Board of Fisheries and Game, Hartford, Conn. 06115)  
Journal of the Fisheries Research Board of Canada 28, No. 8, 1167-1171 (August 1971)

Parker, Phillip S. (National Marine Fisheries Service, Exploratory Fishing and Gear Research Base, Woods Hole, Mass. 02543)  
NOAA Technical Report NMFS Circular-364, iv + 15 pp. (October 1971) For sale by the U.S. Government Printing Office, Washington, D.C. 20402. Price \$0.30. Stock number 0320-0035.

Thirteen adult American shad were tracked with ultrasonic transmitters in 48 of their approaches to commercial drift gill nets in the lower Connecticut River and only one shad was captured. Apparently, the shad possess a remarkable, but as yet not understood, ability to avoid nets, and this phenomena helps explain the low probability of capture of shad in commercial gill nets in the Connecticut River. [1 figure, 1 table, 12 references]

This report reviews the development of gear for harvesting surf clams, Spisula solidissima, along the eastern coast of the United States. Earlier, harvesting of clams was done by use of hand rakes or tongs but today harvesting is done by use of dredges that are operated from stable vessels. [15 figures]

The author examines some legal ramifications of weather modification and control and attempts to assess existing and reasonably foreseeable technological capabilities in the field. [169 footnotes]

Methods for testing the germicidal activity of disinfectants are considered, including those of the Codes of Practice in West Germany. Suggestions are made for supranational work to produce a world-wide Code of Practice on this subject.

Haseett, Charles M. (University of Michigan Law School, Ann Arbor, Mich.)  
Texas International Law Journal 7, No. 1, 89-118 (Summer 1971)

Kornfeld, F.  
Arch. Lebensmittehyg. 22, No. 3, 58-63 (1971) (In German)  
BfMIRA Abstracts 24, No. 6, Abstract No. 1793, 374 (June 1971)

WEATHER MODIFICATION AND CONTROL: INTERNATIONAL ORGANIZATIONAL PROSPECTS

THE CLASSIFICATION OF DISINFECTANTS WHICH ARE NOT OFFICIALLY RECOMMENDED



Kenney, Leon S. (465 22nd Ave. S.E., St. Petersburg, Fla. 33705), Charles Bevis (2902 Terry Road, Tallahassee, Fla. 32303), and Wiley J. Daniels (Rt. 9, Box 634, Tallahassee, Fla. 32301) (pat.)  
U.S. Patent 3,596,308 (August 3, 1971).

Fish of different sizes are conveyed tail first to the filleting station in a V-shaped trough. The trough serves to center the fish as they are presented to the oppositely rotating flexible bandsaw blades, and the downward-cutting blades, whose leading edges are beveled outward, serve to stabilize and assist in preventing the fish from twisting. As the fish are drawn between the blades, they are not pressed against the cutting surface; rather, the blades themselves adjust to conform to the angle of the outer surfaces of the backbone and rib cage of the fish. Thus the maximum amount of flesh is cut off without the bones' being cut into. As the fish are pulled through the blades, a fillet guide directs the fillets away from the skeleton, permitting fillets and skeletons to be easily deposited in separate containers.

13

A simulated abalone product is prepared from a mixture of ground scallops, shredded scallops, and animal gelatin.

**Food Technology** 25, No. 9, 64 (September 1971)

## 2.06 SIMULATED ABALONE

MODEL EXPERIMENTS WITH ANCHORS.  
THE BEHAVIOR OF ANCHORS UNDER WATER IN THE BOTTOM  
WITH SPECIAL REFERENCE TO THE DELTA-ANCHOR

Anonymous  
Holland Shipbuilding 20, No. 3, 194-196 (May 1971)

Experiments with models in test tanks show how anchors behave under water on the bottom. The tests showed that the holding power of an anchor depends upon the weight of the anchor and, mainly, on the ability of the anchor to dig itself deeply into the soil. [13figures] FTP

To get the most for his money, a boat owner should have the right winch installed for the job—not just a big one, to be on the safe side. In this article the editor of World Fishing points out all the factors that must be taken into consideration during selection of an inshore trawl winch that is suitably matched to the boat, the engine, and the fishing gear. The step-by-step calculations are well illustrated with figures and examples. [5 figures] LB

## WHICH WINCH?

Noel, H. S.  
World Fishing 20, No. 10, 18-20 (October 1971)

Official Gazette of the United States Patent Office 891, No. 3, 936, (October 19, 1971)



Lazar, Melvin E. (U.S. Department of Agriculture, ARS, Western Regional Research Laboratory, Berkeley, Calif. 94710), Daryl B. Lund (Department of Food Science, University of Wisconsin, Madison, Wis. 53706), and William C. Dietrich Food Technology 25, No. 7, 24-26 (July 1971)

Certain foods are steam blanched before they are frozen, dehydrated, or canned. Conventional methods of blanching may result in adverse texture in the food product and in loss of nutrients (minerals, certain vitamins, and proteins). Furthermore, the effluent from the blanching operation often shows a high BOD value (Biochemical Oxygen Demand) because of the nutrients that were leached from the food. The new concept in blanching foods---termed IQB or Individual Quick Blanch---should help reduce the quantity of nutrients lost (thereby improving the nutritional value of the products) and reduce the volume and strength of the effluent from the blancher (thereby reducing the pollution problem).

In the IQB system, the pieces of food are spread in a single layer on a mesh belt that moves through a steam chest. The pieces are exposed for a short time to live steam. Before the center of the food becomes hot, the pieces are discharged in a deep bed onto another belt that moves slowly through an insulated chamber. The product is held long enough in the insulated chamber to equilibrate the temperature throughout the entire mass. The process is adjusted so that the equilibrium temperature is sufficient to stop enzyme activity. Appropriate calculations are described.

[3 figures, 1 table, 3 references]

FTP

(1.81)

Boon, David D., and Mahlon C. Tatro (University of Maryland, Natural Resources Institute, Department of Seafood Processing, Crisfield, Md. 21817) Chesapeake Science 12, No. 1, 51-52 (March 1971)

Consumers prefer salty-tasting oysters and will pay a premium for oysters that contain about 1% salt. When packers blow oysters in fresh water (that is, wash them in fresh water agitated by air), the oysters lose salt content. If they are blown in 4% salt solution for 5 min. at 0° C., they will not taste any different from unblown oysters (containing 1.1% salt) taken from high-salinity waters. Although oysters blown in salt solution lose from 10 to 25% of their weight, the higher price they bring may compensate for the weight lost. The authors were unable to produce a gain in salt content without a loss in weight; weight loss and salt gain were positively correlated ( $r = .89$ ).

[1 figure, 1 table, 1 reference]

LB

FTP

Scallops are shucked by use of heat and of centrifugal force.

Food Technology 25, No. 10, 66 (October 1971)

Slade Gorton & Co. Inc. (pat.)

British Patent 1,229,601

#### SCALLOP PROCESSING

2.3

Schneidping, H. F. H. (Federal Republic of Germany) (pat.)

British Patent 1,233,166

BFMIRA Abstracts 24, No. 7, Abstract No. 2216, 455 (July 1971)

The apparatus consists of a washing bath in which the fish are pre-cleaned, followed by a rotating drum into which are water jets, and sprayed. It is claimed to have a particularly efficient cleansing effect.

Reprinted

This is a method of processing shellfish using enzymes under vacuum.

FTP

#### SHELLFISH PROCESSING

2.3

Gomet, K., and S. Kawashima (pat.)

Japanese Patent 10898/71

Food Technology 25, No. 9, 66 (September 1971)

Bone and collagen are separated from animal tissue using an aqueous hydrolyzing solution.

FTP

#### BONE-SEPARATION

2.3

Kuster, W. (pat.)

U.S. Patent 3,580,725

Food Technology 25, No. 9, 78 (September 1971)

#### CARDIOVASCULAR ACTIONS OF SAXITOXIN

2.9

(0.4)

Nagasawa, J., M. Y. Spiegelstein, and C. Y. Kao (Department of Pharmacology, State University of New York, Downstate Medical Center, Brooklyn, N.Y.) [Address requests for reprints to Dr. Kao at 450 Clarkson Ave., Brooklyn, N.Y. 11203] Journal of Pharmacology and Experimental Therapeutics 178, No. 1, 103-109 (July 1971)

Saxitoxin, a low-molecular-weight, nonprotein neurotoxin, is probably produced by several dinoflagellate algae (sp. gonyaulax), whence it is transferred to, and may be extracted from, contaminated shellfish. Although its biological action is mainly similar to that of tetrodotoxin, it is chemically different from that toxin. Among the few biological differences are (1) in small doses, it can cause neuromuscular weakness without affecting the blood pressure (tetrodotoxin always lowers blood pressure when given in doses that cause neuromuscular weakness) and (2) it has never been reported to have caused hypotension in cases of paralytic shellfish poisoning (various degrees of hypotension are a constant feature in cases of poisoning due to tetrodotoxin). This report describes an investigation into the differences in the actions of the two toxins on the peripheral arterial blood pressure of cats.

The findings led the authors to conclude that the main actions of the two toxins on the vascular system are quite similar---they did observe saxitoxin-caused hypotension. The only difference seemed to be in the less severe, shorter-lasting hypotension caused by saxitoxin and the greater tendency for a secondary pressor effect to follow the hypotensive episode. They hypothesize that the release of

(over)



## 2.9 TOXICITY OF THE COMMON PUFFER FISH IN HONG KONG

Yip, L. L., and K. W. Chiu (Dep. Biol., Chinese Univ. Hong Kong, Hong Kong) *Chemical Abstracts* 75, No. 11, 74320z (September 13, 1971)

## 2.9 OCCURRENCE OF TOXIC CRABS IN THE PALAU ISLANDS

Note, Gordon E., Bruce W. Halstead, and Yoshiro Hashimoto (World Life Research Inst., International Biotoxicological Center, Colton, Calif.)  
 Clinical Toxicology 3, No. 4, 597-607 (December 1970)  
 Government Research Announcements 71, No. 16, 66 (August 25, 1971)

Two human case histories (fatalities caused by the ingestion of marine crabs) are reported. Extracted from authors' abstract

Government Research Announcements 71, No. 13, 106 (July 10, 1971)

The report summarizes advances made on the study of ciguatera and other marine toxins.  
[Author's abstract in part]

Banner, Albert H. (University of Hawaii, Honolulu, Hawaii)  
 Rept no. TR-1 Contract N00014-67-C-0127, 12 pp. (April 1, 1971) Available from the  
 National Technical Information Service, Operations Division, Springfield, Va.  
 22151. Order No. AD-723 238. FC\$3.00; MF\$0.95.

## 2.9 EXPLORATION FOR TOXIC MARINE ANIMALS IN THE TROPICAL PACIFIC

2.9  
(1.9) PALTOKIN: NEW MARINE TOXIN FROM A COELENTERATE

Moore, Richard Elliott, and Paul J. Scheuer (Dep. Chem., Univ. Hawaii, Honolulu, Hawaii)

2.9 BRINE SHRIMP (ARTEMIA SALINA) LARVAE AS A SCREENING SYSTEM  
(1.85) (0.5)  
(7.89) FOR FUNGAL TOXINS

Harwig, J., and Peter Michael Scott (Food Drug Dir., Dep. Natl. Health Welf.,  
Ottawa, Ontario, Canada)  
Chemical Abstracts 75, No. 7, 45809k (August 16, 1971)

[4 figures, 3 tables, 10 references]

catecholamines accounts for all these differences. If the catecholamine release is caused by reflex response to the lowered systemic pressure, they conclude that the effect of saxitoxin on the vasomotor afferent nerves must be less severe than is the effect of tetrodotoxin, since some of the vasodilatory nerves remained functional after administration of saxitoxin, whereas similar nerves were completely blocked after administration of tetrodotoxin. And if the catecholamine release and secondary effect in the cat have any counterparts in man, the hypotension that probably occurs in human victims of saxitoxin-caused shellfish poisoning is of too brief duration to be recorded.

### 2.3.3 CUTTLEFISH PROCESSING

Ishida, Y., and T. Isomoto (pat.)  
Japanese Patent 16129/71  
Food Technology 25, No. 10, 66 (October 1971)

Cuttlefish are repeatedly roasted, rolled, and mechanically folded in order to make the meat more digestible.

### 2.3 CULINARY UTENSILS

Rollband, Ernest J. (3415 Slaterville Rd., R.D. 1, Brooktondale, N.Y. 14817) (pat.)  
U.S. Patent 3,609,800  
Official Gazette of the United States Patent Office 891, No. 1, 23 (October 5, 1971)

The utensil consists of a frame having a hooked portion for the safe and easy removal of the dorsal shell of crustaceans (such as lobsters). FTP

Foodstuffs are cooked by immersing them in a heated liquid cooking medium contained in a pressure vessel.

Thompson, Neal W. (Monroeville, Pa.; assignor to Small Business Administration)  
U.S. Patent 3,613,550  
Official Gazette of the United States Patent Office 891, No. 3, 1001 (October 19, 1971)

## 2.3 APPARATUS FOR COOKING FOODSTUFFS

2.43 MATERIALS BASED ON POLYVINYLCHLORIDE FOR PACKAGING FOOD PRODUCTS  
(3.238) (MATERIALY NA OSNOVE POLYVINILCHLORIDA DLYA UPAKOVKI)

PISHCHERYKH PRODUKTUV)

Chantseva, A. S.; R. P. Chernovskaya, and Yu. V. Ovchinnikov  
Trans. from *Plasticheskie Massy* (USSR) No. 6 (1970)  
Report No. FSCT-TT-23-886-71, 10 pp. (July 14, 1971) Available from the National  
Technical Information Service, Operations Division, Springfield, Va. 22151.  
Order No. AD-728 150. PC\$3.00; MF\$0.95  
Government Research Announcement 71, No. 19, 95 (October 10, 1971)

The physical, mechanical and toxic properties of various types of polyvinyl chloride films suitable for use as food wrapping materials are presented. (Author)  
Reprinted

rings. FTP

Official Gazette of the United States Patent Office 891, No. 3, 1053-1054 (October 19, 1971)

This patent covers an apparatus for comminuting meat in which the material undergoes a fine comminuting action during passage between the teeth of rotary

### 2.3 APPARATUS FOR FINELY COMMINTING MEAT OR THE LIKE

Otto, Friedrich (Hamein, West Germany, assignor to Belder Trust, Reg., Vaduz, Liechtenstein)  
U.S. Patent 3,613,755  
Official Gazette of the United States Patent Office 891, No. 3, 1053-1054 (Oct  
19, 1971)



Murchison, W., and S. E. Crow; Cerebos Foods Ltd. (pat.)  
British Patent 1,211,349  
BFMIRA Abstracts 24, No. 1, Abstract No. 259, p. 53 (January 1971)

Pasteurized moist foodstuffs for example composite meals when packaged in sealed plastic bags must be at an acid pH in order to preserve them bacteriologically. In this invention the acidified food is packaged along with an acid-neutralizing substance (sodium carbonate or bicarbonate) which is not available to act upon the foodstuff during storage at ambient temperatures, but is released by heating prior to removal from the package. The bicarbonate is present in capsules or film-coated tablets (for example, of gelatin tanned with formaldehyde or polyvinyl alcohol).  
Reprinted

Reprinted

5 months, a breakdown of 21.4% after 16 weeks was found in herring salad. In fruit juices an initial concentration of 981 mg/l sorbic acid was reduced to 959 mg/l sorbic acid after 30 months. C.S.B.

Reprinted

The breakdown of sorbic acid in aqueous solution was as great as 80% after 5 months, a breakdown of 21.4% after 16 weeks was found in herring salad. In fruit juices an initial concentration of 981 mg/l sorbic acid was reduced to 959 mg/l sorbic acid after 30 months. C.S.B.

## 3.12 INVESTIGATION INTO THE STABILITY OF SORBIC ACID

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 52 PAGE 51

Heintze, K.  
Lebensm.-Wiss.-Technol. 4, No. 2, 64-65 (1971) (In German)  
BFMIRA Abstracts 24, Supplement, Abstract No. 2484, 513 (July/August 1971)

3.15 THE EFFECT OF  $\gamma$ -IRRADIATION ON THE AMINO ACID CONTENT OF PROTEINS

(23.0)

Chaudhry, M. T. Nadeem, and R. A. Evans (Department of Biochemistry and Soil Science, University College of North Wales, Bangor, Caerns., United Kingdom)  
Biochemical Journal 124, No. 2, 262P-30P (September 1971)

This note reports on the effect of  $\gamma$ -irradiation on the amino-acid content of accelerated-freeze-dried egg and on wheat gluten. After irradiation of samples of the commercial products, methionine and tryptophan were significantly damaged in the freeze-dried egg, and tryptophan, threonine, and methionine were significantly diminished in the wheat gluten.

Reprinted in part

The feasibility of  $\gamma$  processing for extension of the storage life of lobster tails (scampi), shrimp, and cod fish during export from Iceland was investigated.

Report, 93 pp. (April 1971) Available from the IAEA, \$3.00.  
Nuclear Science Abstracts 25, No. 18, 4192 (September 30, 1971)

## 3.15 RADURIZATION OF SCAMPI, SHRIMP, AND COD

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 52 PAGE 51

3.231

## GOWEN'S FISH MOLD GEAR ASSURES UNIFORM BLOCKS

Anonymous

National Fisherman 52, No. 7, 12C (November 1971)

A new line of patented fish-mold equipment is said to offer producers of frozen fish blocks substantial savings. The equipment consists of extruded aluminum-frame molds, with pans and covers; a "dimple box," which ensures that air is forced out of the product as the blocks are formed; an automatic, air-operated ejector unit, which presses the boxed frozen blocks from the frame without causing damage or cracks, by applying a uniform force over the full surface of the blocks; a conveyor and bulk storage racks designed to handle the frames. The frames, which are specially constructed to keep their size and shape, can be used to mold either singly or in pairs--uniform, accurate 16.5- or 18.5-lb. blocks.

[1 figure]

LB

Compositions containing chloramphenicol are used to maintain freshness of lobsters.

FIP

Ogawa, H. (pat.)  
Japanese Patent 15654/71  
Food Technology 25, No. 10, 66 (October 1971)

## 3.12 LOBSTER PROCESSING

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 15

3.234

(1.86)(3.24)

## FREEZING AND STORAGE LIFE OF BLUE CRAB CLAWS

Paparella, Michael W., and Mahlon C. Tatro (University of Maryland, National Research Institute, Department of Seafood Processing, Crisfield, Md. 21817)  
Chesapeake Science 12, No. 2, 119-120 (June 1971)

During periods of abundance, processors who don't own claw-picking machines often discard the claws of cooked crabs. To help these processors make full use of the raw materials harvested for processing, the authors investigated three methods of freezing and storing the claws: (1) individual quick freezing by immersing the claws in liquid Freon-12 Food Freezant for 3 min. at -22° F.; packaging and sealing about 2 doz. claws in polyethylene bags, and storing at -25° F.; and (2) packaging and sealing about 2 doz. claws in polyethylene bags, freezing, and storing at -25° F.; and (3) packaging and sealing about 2 doz. claws in polyethylene bags, freezing, and storing at -10° F. Biweekly taste tests for 12 weeks revealed no significant differences in the flavor or texture of the meat from claws frozen and stored by the three methods. All tasters agreed that the claws boiled for 4 min. without thawing were acceptable throughout the 3-mo. storage period. The authors emphasize the importance of good quality control during processing and of adequate air circulation in the cold-storage room.

[1 figure]

LB

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 15



3.231  
(3.2381)  
PROCESS AND DEVICE FOR GLAZING DEEP-FROZEN BLOCKS OF FISH  
(VERFAHREN UND VORRICHTUNG ZUM GLASIEREN VON TIEFGEKÜLTEN  
FISCHBLÖCKEN)

Code, F. (Nordischer Maschinenbau) (pat.)  
West German Patent Application 1,501,298 (1969) (In German)  
Food Science and Technology Abstracts 3, No. 3, 3R104, 501 (March 1971)

After fish blocks are frozen, they are passed quickly through a tank of glazing liquid. Between the end walls of the tank is a shaft around which carriers long enough to pick up two or more fish blocks rotate. The blocks are thus swung through the glazing liquid in a cycle. The end walls may have inlet and outlet openings to receive and discharge the blocks.

The machine individually moves cooked hard-shell Chesapeake Bay crabs along endless chains or belts to and through successive stations at which the carapace, claws, walking legs, swimming legs, and viscera are removed and the remaining carcass is scrubbed and washed. The significant feature of this machine is the provision on each section of the transporting carriage of movable supporting and cutting members that automatically adjust to the size of each individual crab.

Tolley, Calvert B. (Wingate, Md. 21675) (pat.)  
U.S. Patent 3,596,310 (August 3, 1971)

3.231 CRAB-PROCESSING MACHINE  
(1.86)(3.3344)

3.12 EFFECT OF SODIUM CITRATE ON THE KEEPING QUALITY OF FROZEN SURIMI  
(6.54) (FROZEN FISH PASTE)

Okada, Minoru (Tokai Reg. Fis. Res. Lab., Min. Agr. Forest., Tokyo, Japan)  
Chemical Abstracts 74, No. 1, 2790j (January 4, 1971)

### 3.2.7 DIELECTRIC HEATING PROCESS

Plastics Manufacturing Co. (pat.)  
British Patent 1,224,944  
Food Technology 25, No. 9, 78 (September 1971)

Frozen foods are thawed in 1 to 2 min. by a dielectric heating process. RTP

"Thawing methods of current interest are described together with some discussion of their advantages and disadvantages: air blast, water, heated plates, dielectric and electric resistance. Whole fish and fillets are considered but emphasis is placed on industrial thawers for blocks of whole fish, particularly of the sort frozen at sea, typically  $50 \times 100 \times 10$  cm thick and about 40 kg in weight." Reprinted

Merritt, J. H.  
Freezing Irr. Fish. pp. 196-200 (1969)  
BFMIRA Abstracts 24, No. 7, Abstract No. 2091, 433 (July 1971)

### 3.12 PRESERVATIVE

Uenosetayaku Oyo Kenkyusho K.K. (pat.)  
Japanese Patent 10020/71  
Food Technology 25, No. 9, '77 (September 1971)

Particulate sorbic acid coated with hardened vegetable oils is incorporated into foodstuffs.

### 3.12 PRESERVATIVE SYSTEMS

Ogawa, H. (pat.)  
Japanese Patent 13661/71  
Food Technology 25, No. 9, 77 (September 1971)

A food preservative is made of a mixture of an organic carboxylic acid, a phosphate, aluminum salt, and a chlorine-containing sterilizer (mixture has adjusted pH of 5-12).

Foodstuffs containing sorbic, propionic, or benzoic acid are improved by adding hydrogen phosphate peroxide adducts.

**Food Technology 25, No. 9, 77 (September 1971)**

Ogawa, H. (pat.)  
Japanese Patent 13660/71.

### 3.12 PRESERVATIVE SYSTEMS

### 3.17 ICE FISH PRESERVATION (3.12)

Nissin Trade Co., Ltd. (pat.)  
Japanese Patent 10272/71  
Food Technology 25, No. 9, 66 (September 1971)

Iced fish are preserved with an ice made from sea water and containing dispersed powdered zeolite materials.

### 3.11 POLYPHOSPHATE TREATMENT OF COD MUSCLE

Sutton, Alan H. (Unilever Res. Lab., Aberdeen, Scotland)  
Chemical Abstracts 74, No. 1, 2788g (January 4, 1971)

The prolonging of refrigeration shelf life (at 0° C.) of pike and saithe was studied by radiation pasteurizing the fish with cobalt-60 gamma rays.

Linko, R. R. (Huntamaekiytymä Oy, Turku, Finland)  
Maataloustieteellinen Aikak. 42, 254-261 (1970)  
Nuclear Science Abstracts 25, No. 14, 3231 (July 31, 1971)

### 3.15 IRRADIATION PRESERVATION OF FOODS. PART I. PROLONGATION OF THE KEEPING QUALITY OF FRESH FISH BY RADIATION PASTEURIZATION



Anonymous

Tidssk. Hermetikind 55, No. 12, 325-326 (1969) (In English)  
 BFMTA Abstracts 24, No. 7, Abstract No. 2146, 442 (July 1971)

The recommendations of the Norwegian research Laboratory for the canning industry for the storage of canned foods are presented. According to the information given in the abstract, brisling in oil, canned meats and canned vegetables can be stored in cool dry conditions for two years and longer, refrigeration being preferable but not necessary; sild, mackerel in tomato sauce and kippers have a storage life of about two years under the same conditions when refrigeration is employed; for fish balls, fingers, ready-meals and other fish products stored at 0° to 10° C the storage life is two years; under the latter conditions shrimps, prawns and crabs have a storage life of about one year and berries, fruits and acid vegetables one to two years; sausages, hams and tongues have a limited storage life and should be stored at 0° to 10° C; and Scandinavian anchovies, gaffel-bitters (herring hors d'oeuvre) have a storage life limited to 3 to 6 months at 0° to 10° C. C.C.E.

FTP

Phytic acid is used to improve the quality of fish paste products.

Reprinted

Isi, S. et al. (pat.)  
 Japanese Patent 10029/71  
 Food Technology 25, No. 10, 66 (October 1971)

## 3.12 FISH PASTE PRODUCT

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 2 PAGE 47

## 3.19 A PRACTICAL METHOD FOR DRYING FRESHWATER FISH

(92.1)

Lantz, A. W., and D. G. Iredale (Fisheries Research Board of Canada Freshwater Institute, Winnipeg, Manitoba)

Journal of the Fisheries Research Board of Canada 28, No. 7, 1661 (July 1971)

Several fish species of limited sales potential are caught in amounts that make reduction by conventional meal-manufacturing methods impractical. The simple drying method proposed here, and the uncomplicated equipment it requires, may be one solution to the problem of utilizing such species, which are frequently caught incidentally during normal commercial fishing.

The dryer is made of 3/4-in. plywood sheets, wood-framed screen trays supported on brackets spaced about 6 in. apart, and a standard oil-fired space heater that keeps the fresh air passing through the heating chamber at 250° F. Fish cut transversely into 1/4- or 1/2-in. steaks will dry in about 7 hr, or appreciably faster and more completely than whole fillets, dressed fish, or minced fish; final weight reduction reaches 80%. The dried fish are used as ingredients in dog food, cat food, and other animal products. The method is simple and economical and can be adapted to efficient drying of fish of a larger size than shown in this report by increasing the size of the dryer. Several lateral dimensions of the dryer are given in figures, table 1, and references [2].

BT

[References]

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 2 PAGE 47

4.1 (1.51)

ERYTHROCYTE LIPIDS OF ATLANTIC COD, *GADUS MORHUA*

Addison, R. F., and R. G. Ackman (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)  
 Canadian Journal of Biochemistry 49, No. 8, 873-876 (August 1971)

The lipid composition of the (nucleated) erythrocytes of five, market-size, male Atlantic cod was examined. The erythrocytes were ellipsoidal, measuring about 12 by 6 by 6  $\mu$  in diameter and having a volume of 180  $\mu^3$ . Lipid content was 16.5-10.1% g./cell; lipid per unit cell volume was  $9.2 \times 10^{-15}$  g./ $\mu^3$ . Determined chromatographically, neutral lipid constituted 23.7% of the total; phospholipid, 76.3%. Determined by  $PO_4^{3-}$  analysis, phospholipid constituted 78.8% of the total. Calculated as a percent of the total lipid, lecithin was 43.2%, noncholine phospholipid 23.0%, cholesterol 10.8%, colored material and cardiolipid 5.2%, triglycerides 5.0%, sphingomyelin 4.9%, free fatty acids 3.7%, hydrocarbons 2.4%, and sterol esters 1.8%. The major fatty acids were (as a percentage of all fatty acids from C<sub>12</sub> to C<sub>22</sub>): 22:6 $\omega$ 3, 24:5 $\omega$ 3, 18:1, 17:3 $\omega$ 3, 16:0, 17:0 $\omega$ 3, and 20:5 $\omega$ 3, 14:4 $\omega$ 3. In general, these lipids are quite similar to those of the cod muscle.

[3 tables, 13 references]

LB

Chemical Abstracts 74, No. 25, 139671r (June 21, 1971)

## 4.14 CHARACTERISTICS OF THE COMPOSITION OF SPERM WHALE OIL

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 2 PAGE 47

## ANALYSIS OF FREE FATTY ACIDS

11.4

Hamilton, and M. Yaqub Raie (Chemistry Department, Liverpool Polytechnic, Byrom Street, Liverpool L3 3AF, England)

Chemistry and Industry No. 23, 221-222 (October 23, 1971)

During studies of the positional isomers in sperm whale oil alcohols using the von Rudolff oxidation technique [R. J. Hamilton, M. Y. Raie, and M. Y. Raie, *Journal of the American Oil Chemists' Society*, in press], the authors found the major difficulty to be the analysis of the volatile short-chain acids which are liberated. Previously, the free fatty acids were extracted from aqueous solution with appropriate solvents. The researchers modified, slightly, the von Rudolff oxidation technique eliminating the extraction step and developed a method for the direct analysis of the volatile acids in aqueous solution. It was possible to determine the position of the double bond in alcohols of methyl esters at a level of 100-1000  $\mu$ mol/l. (8 references)

FTP

Chemical Abstracts 73, No. 5, 22644x (August 3, 1970)

Sugita, Mitsumi, Ikuko Arakawa, Osamu Itasaka, and Taro Hori (Shiga Univ., Otsu, Japan)

BIOCHEMICAL STUDIES OF SHELLFISH LIPIDS. XI. ISOLATION OF SPHINGOMYELIN AND ITS FATTY ACID COMPONENTS

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 2 PAGE 47



Fd Trade Rev. 41, No. 4, 31-32 (1971)  
BRTMRA Abstracts 24, Supplement, Abstract No. 2290, 472 (July/August 1971)

The term equilibrium moisture is defined and the operating principles, care and applications of an instrument developed for the purpose of measuring this 'condition' in foodstuffs are described. The instrument is suitable for in-line process-control applications. C.C.E. Reprinted

Chiu, George Hao, and Clarence Sterling (Dep. Food Sci. Technol., Univ. California, Davis, Calif.)

3.2495  
(0.321) (3.64)      PARAMETERS OF TEXTURE CHANGE IN PROCESSED FISH  
MYOSIN DENATURATION

Fish meat is mixed with starch, gelatin, and a foaming agent. The mixture can then be foamed and dried.

Food Technology 25, No. 9, 66 (September 1971)

3.60 DRIED FISH PRODUCT

Sudo, A. (pat.)  
10805/71

## SMOKED CARP

Chiba, Toku (pat.)  
Japanese Patent 922  
Food Technology 25,

Japanese Patent 525774  
Food Technology 25, No. 9, 66 (September 1971)

Carp are held in brine for up to 2 weeks and then in a solution containing FTP for 4-5 hr. The carp are then smoked.

Chemical Abstracts 75, No. 5, 34247z (August 2, 1971)

Quilmicamp, Lta. (pat.)  
Spanish Patent 364,763 (Jan. 1, 1971)

(1.80) IN SHELLFISH

### 3.1.1 COMPOSITIONS FOR TREATING POSTMORTEM MELANOGENESIS

have been given little or no publicity in the literature or not. [20 figures, 143 references]

The major technological developments in food canning as reported in the literature up to 1970 are reviewed. Many of the developments being used commercially have been given little or no publicity in the technical and trade literature.

CRC Critical Reviews in Food Technology 2, No. 2, 187-243 (July 1971).

3.338 FOOD CANNING IN RIGID AND FLEXIBLE PACKAGES

Brody, Aaron (Arthur D. Little, Inc., Cambridge, Mass., 187-2)

18

[4 tables, 28 references]

from accumulating, along with phytanic and pristanic acids, by degrading trans-2-phytenic acid or an intermediate pristanic acid to 4,8,12-TMD.

They found that all three of these mollusks contain isoprenoid, iso, ante-

They found that all three of these mollusks contain isoprenoid, iso, ante-iso, and normal odd-numbered fatty acids qualitatively similar to those previously reported for higher aquatic animals. Trends in the branched chain and

ously reported for higher aquatic animals. Trends in the branched-chain and normal odd-numbered fatty acids of all three tend to be quantitatively associated with trends in the neighboring normal even-numbered fatty acids—specifically with the myristic, palmitic, and stearic acids. The isoprenoid fatty acids of periwinkle were markedly unbalanced, both in absolute terms and in the relation of 4,8,12-TMTD to pristane and phytanic acids. Presumably the periwinkle 'shere-

In 1968, Ackman and Hooper determined the proportions of the three common isoprenoid fatty acids (4,8,12-trimethyltridecanoic acid [4,8,12-TMTD], 2,6,10-14-tetramethylpentadecanoic acid [pristanic acid], and 3,7,11-15-tetramethylhexadecanoic acid [phytanic acid]) for marine mammals and fish fairly high in the aquatic food chain. In the present report, they extend their investigations to two filter feeders, the oyster and the quahaug, and to a grazing herbivore, the common periwinkle.

Comparative Biochemistry and Physiology 39B, 579-587 (1971)

Ackman, R. G., S. N. Hooper, and P. J. Ke (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)

THE DISTRIBUTION OF SATURATED AND ISOPRENOID FATTY ACIDS  
IN THE LIPIDS OF THREE SPECIES OF MOLLUSCS, LITTORINA LITTOREA,  
CRASSOSTREA VIRGINICA AND VENUS MERCENARIA

#### 4.13 THE LIPIDS OF KRILL (EUPHAUSIA SPECIES) AND RED CRAB

Van Der Veen., B. Medawski, and H.S. Olcott (Department of Nutritional Sciences, Institute of Marine Resources, University of California, Berkeley, Calif.)  
Lipids 6, No. 7, 481-485 (July 1971)

Tables are given showing the fatty acid composition of various fractions of the lipids of krill and red crab. Apparently the lipids of these organisms contain a large number of unusual fatty acids. [5 tables, 15 references] FTP

[1 figure, 1 table, 11 references]

The authors compared the chromatographic behavior of 1,2-, 1,3-, 1,4-, and 1,2,12-long-chain alkane diols and 1-O-alkylglycerols and their derivatives. They also document in this report the formation of 1,3-alkane diols (after  $\text{LiAlH}_4$  reduction) from  $1\text{-}^{14}\text{C}$ -labeled fatty acids incubated with mitochondrial fractions from heart and liver of rats. They point out a technique for distinguishing several types of alkane diols from 0-alkylglycerols.

Blank, M. L., Edgar A. Cress, Nelson Stephens, and Fred Snyder (Medical Division, Oak Ridge Associated Universities, Oak Ridge, Tenn. 37830)  
*Journal of Lipid Research* **12**, No. 5, 638-640 (September 1971)



Ackman, R. G. (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)  
Lipids 6, No. 7, 520-522 (July 1971)

The body oils of alewife, tullibee, maria, and sheephead (fresh-water fishes), the body oils of Atlantic winter herring and Atlantic summer sand lance, and the liver oils of Atlantic cod and Pacific (gray) cod were examined for pristane (2,6,10,14-tetramethylpentadecane) and associated hydrocarbons (phytane, and C<sub>15</sub>, C<sub>16</sub>, C<sub>17</sub>, C<sub>18</sub>, and C<sub>19</sub> normal alkanes). Pristane levels in the body oils of the four fresh-water fishes were less than 0.0001%; pristane levels in the marine fish (herring and sand lance) body and fish Atlantic cod and Pacific cod) liver oils were between 0.008% and 0.107%. Heptadecane was predominant in the fresh-water fish oils; octadecane was more prevalent than heptadecane in three of the marine oils. [1 figure, 1 table, 18 references]

FTP  
Government Research Announcements 71, No. 18, 48 (September 25, 1971)

Norris, Kenneth S., and Thomas P. Dohl  
Status Report, 1 January-30 June 1971, 7 pp. (June 30, 1971) Contract N00014-71-C-0439. (Oceanic Inst. Waimanalo, Hawaii) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151, Order No. AD-727 749. PC\$3.00; MF\$0.95.

#### 4.2 OBSERVATIONS OF FREE-SWIMMING PORPOISES AND WHALE SCHOOLS AND STUDIES OF THE CHEMISTRY OF HEAD OIL IN PORPOISES

COMMERCIAL FISHERIES ABSTRACTS

61 PAGE 2 NO 52 VOL

4.89 CHOLELITHIASIS IN RABBITS: EFFECTS OF COD LIVER OIL ON DISSOLUTION OF GALLSTONES (470) (1574)

Borgman, R. F., and F. H. Haselden  
Amer. J. Vet. Res. 32, 427-432 (1971)  
American Journal of Digestive Diseases 16, No. 9, 968 (September 1971)

New Zealand white rabbits fed a diet containing 15% cellulose, 15% olive oil, and 40% casein for 6 mo. developed gallstones. The gallstones dissolved after 3-6 mo. in those rabbits fed the same diet but with 100 g. of cod-liver oil/kg. of diet added. Cod-liver oil in lesser amounts was not effective. Fractionation indicated that the glyceride fraction of the oil was the only effective fraction--the phospholipid fraction, the free fatty acids, or the nonsaponified fractions after cold saponification gave no noticeable results.

The large proportions of cod-liver oil needed to dissolve gallstones may militate against its use as a treatment for cholelithiasis. The authors speculate that their results may indicate a reason for the low incidence of gallstones among people whose diet is predominantly fish.

BT  
Simon, Rene (pat.)  
French Patent 1,601,008  
Chemical Abstracts 74, No. 22, 115807p (May 31, 1971)

#### 4.89 COMPOSITION FOR THE TREATMENT OR WASHING OF HAIR (636)

COMMERCIAL FISHERIES ABSTRACTS

61 PAGE 2 NO 52 VOL

6.130 (9.19) (6.59)

PROTEIN BEING RETRIEVED

Anonymous  
Fishermen's News 27, No. 17, 11 (September 1971--2nd issue)

According to F. G. Claggett of the Fisheries Research Board of Canada, Vancouver, British Columbia, a treatment plant for waste water discharged at a B.C. salmon cannery is perhaps the first of its kind in the world. It is making possible retrieval of as much as 4 tons of marketable protein and oil a day. The salmon packers contributed the site and the waste water, and the Canadian Government and the Fisheries Association of British Columbia financed the \$100,000 treatment plant. The waste water, which formerly was dumped into the Fraser River, is first treated with sodium hydroxide and aluminum sulfate and then skimmed. The solids are sold as animal feed for \$6 a 100 lb.; treating enough water to produce 100 lb. of feed costs \$0.15.

Although the waste from cod, sole, rockfish, halibut, herring, and shellfish processing might be minimal, the Fisheries Board plans to try to process such waste when the salmon season ends. Thus the plant can be used to the maximum.

Witas, Tadeusz (Inst. Technol. Przem. Rybn. Wyzsza Szk. Roln., Szczecin, Poland)  
Chemical Abstracts 75, No. 9, 62281z (August 30, 1971)

#### 6.139 (6.14) INFLUENCE OF THE PRODUCTION PROCESS ON THE CONTENT OF FOLIC ACID IN FISH MEALS

COMMERCIAL FISHERIES ABSTRACTS

61 PAGE 2 NO 25 VOL

6.34 CONFORMATIONAL ENERGY CALCULATIONS OF ALGINIC ACID

Whittington, S. G. (Biophysics Division, Unilever Research Laboratory, Colworth/Wellwyn, The Frythe, Welwyn, Herts., England)  
Biopolymers 10, No. 9, 1481-1489 and 1617-1623 (September 1971)

I. Helix Parameters and Flexibility of the Homopolymers; pp. 1481-1489.

The author calculated the helix parameters of the homopolymers (from the conformational energy maps he had calculated for the 1-4-linked dimers of D-mannuronic acid [MM] and L-guluronic acid [GG]), as well as their characteristic ratios, persistence lengths, and radii of gyration. He found that although both polymers are very stiff and extended, poly(guluronic acid) is the more so. [3 figures, 2 tables, 18 references]

II. Conformational Statistics of the Copolymers; pp. 1617-1623.

From the conformational maps for mannuronic acid (124) guluronic acid [MG] and for guluronic acid (124) mannuronic acid [GM], the author calculated the characteristic ratio and persistence length of the alternating copolymers. Then, with these maps and those previously calculated for the dimers MM and GG, he calculated the characteristic ratio and persistence length of the stochastic copolymer. Comparison of these calculated results with the experimental results reported by Smidsrud for alginate isolated from *L. digitata* showed that the two sets of results agreed quite well. [1 figure, 3 tables, 18 references]

COMMERCIAL FISHERIES ABSTRACTS

VOL 25 NO 2 PAGE 19



Bhatnagar, Rajendra K., Surinder Singh, and Yoginder M. Chandhok (Council of Scientific and Industrial Research, India) (pat.)  
Indian Patent 112,474

4.83

Bhatt, H. A.; Tagdiwala, P. V. (Dep. Chem. Technol., Univ. Bombay, Bombay, India) *Chemical Abstracts* **73**, No. 16, 78604b (October 19, 1970)

tion. D.M.L.

Unicellular blue-green algae (3 species) and a unicellular green alga contained from 0.9 to 4.0  $\mu\text{g}$ . of  $\alpha$ -tocopherol per g. (dry weight basis).

Revue fr. Cps gras 18, No. 1, 1/-20 (19/1) (In French, English summary)

#### 4.21 THE OXIDATION OF SALTED MARGARINE

6.137  
FAT PURIFICATION

Yasuda, Shigejiro (Faculty of General Education, Hiroshima University, Higashi-senda-machi, Hiroshima-shi, Japan)  
Journal of the Japan Oil Chemists' Society **20**, No. 8, 479-483 (1971) (In Japanese; abstract in English)

The data show that the sterol composition of marine and fresh-water snails, fresh-water and brackish water bivalves is different from that of marine bivalves.

[4 figures, 3 tables, 18 references]

in the lipid. [9 figures, 3 tables, 18 references] **FTP**

The authors examined the oxidation of the lipids in fish (anchovy and pilchard) meals by use of the oxygen absorption test, by determining peroxide values, and by chromatographic analyses. They found that: (1) other oxygen-consuming reactions account for up to 10 times the oxygen consumed by simple peroxidation of the polyunsaturated lipid; (2) increasing the moisture content of the fish meal produces a marked prooxidant effect in all the oxidative reactions; and (3) the overall rate of reaction is apparently independent of the peroxide concentration in the lipid. [9 figures, 3 tables, 18 references] FTP

Journal of the American Oil Chemists' Society 48, No. 8, 420-424 (August 1971)

Waisblich, Mario D., Lucy Guzman, and Florencio P. Plachco (Fisheries Development Institute, IFOF, Casilla 1287, Santiago, Chile, and Department of Chemistry, Universidad de Chile, Casilla 2777, Santiago)

#### 4.5 (6.14) OXIDATION OF LIPIDS IN FISH MEAL

6.135 CATALYTIC COMBUSTION OF EXHAUST AIR IN OILS AND FATS PLANTS  
(9.19) FOR THE REDUCTION OF ODOUR

**Christner, H. K.**

**Rechte Seifen-Mittel** 73, No. 2, 122-126 (1971) (In German, English summary)  
**BEMIRA** Abstracts 24, No. 6, Abstract No. 1583, 331 (June 1971)

The exhaust air from oils and fats of animal origin was analysed and shown to contain large numbers of strongly smelling compounds (low C number fatty acids, aldehydes, ketones, H<sub>2</sub>S). Catalytic combustion at 350° C converted 95% of these compounds to CO<sub>2</sub> and H<sub>2</sub>O. C.S.B. Reprinted

6.18 LIQUID FERTILIZER FROM SHRIMP AND FISH WASTES

Ismail, P. K., and P. Madhavan (Cent. Inst. Fish. Technol., Cochin, India) Chemical Abstracts 74, No. 21, 111088g (May 24, 1971)

Sodium silicate, a phosphate buffer, a wetting agent, and a coupling agent (such as tannic acid) are added to heated (130°-212° F.) crude animal fat. The mixture is allowed to stand during which time the silicic acid that forms slowly trickles through the fat and removes proteinaceous impurities. FTP

Jennings, W. H. (pat.)  
British Patent 1,230,409  
Food Technology 25, No. 10, 69 (October 1971)

6.137  
FAT PURIFICATION

### 6.32 CONTENT OF $\alpha$ -TOCOPHEROL IN SOME BLUE-GREEN ALGAE

Dasilva, Edear J. (Department of Microbiology, St. Xavier's College, Bombay-1,

Trondheim-NTH, Norway)

Biochimica et Biophysica Acta 239, No. 2, 345-347 (July 13, 1971)

Unicellular blue-green algae (3 species) and a unicellular green alga con-

FTP [1 table, 11 references]

ИЛЭ

### 6.32 DISTRIBUTION OF 21:6 HYDROCARBON AND ITS RELATION

Lee, Richard F., and A. R. Loeblich, III (Scripps Inst. Oceanogr., La Jolla Calif.)  
Chemical Abstracts 75, No. 3, 16362d (July 19, 1971)

[4 figures, 3 tables, 13 references]

Agarose and agarpectin were isolated from agar of various red seaweeds and some of their chemical and physical properties were determined.

Agricultural and Biological Chemistry 35, No. 6, 799-804 (June 1971)

Fuse, Tsuneaki, and Fujio Goto (Food Research Institute, Aichi Prefecture, Nagoya, Japan)



## SHRIMP MEAL -- A NEW LOOK AT AN OLD PRODUCT

Meyers, S. P., and J. E. Rutledge (Department of Food Science, Louisiana State University, Baton Rouge, La. 70803)  
Feedstuffs 43, No. 49, 31-32 (November 27, 1971)

In 1969, shrimp constituted 29% of the total U.S. fishery landings. During processing, the head, the carapace, and the soluble components are wasted; the head alone makes up some 44% of the whole raw shrimp. Meal made from fresh shrimp heads has a total protein content of almost 48% and an amino-acid spectrum similar to that of menhaden meal and of several other crustacean meal products presently used in animal feeds. These facts dictate more effective utilization of shrimp wastes.

Already the meal made from shrimp wastes is being used in diets fed to hatchery fish and crustaceans, poultry, and swine. In addition to its growth-promoting nutritional qualities, its pigment content enhances the color of fish flesh and egg yolks. Chitin from prawn-shell waste has been converted to glucosamine hydrochloride, and krill has been subjected to an enzymatic treatment that loosens and removes edible tissue from the shells. The protein paste so produced is used for pet and snack foods or for flavoring components. Other uses of shrimp waste--such as fortification of shrimp meal with the nutritionally valuable components of the waste water from cannery operations--await further biochemical and technological developments. Such developments might begin with further studies of small meal-rendering plants for shipboard processing and of such low-temperature meal processing techniques as sun drying and vacuum drying. [1 table] LB

## COMPARATIVE UTILIZATION OF CASEIN, FISH PROTEIN CONCENTRATE AND ISOLATED SOYBEAN PROTEIN IN LIQUID DIETS FOR GROWTH OF BABY PIGS

Pond, W. G., W. Snyder, and E. F. Walker, Jr. (Department of Animal Science, Cornell University, Ithaca, N.Y. 14850); B. R. Stillings and Virginia Sidwell (National Marine Fisheries Service, National Center for Fish Protein Concentrate, College Park, Md. 20740)  
Journal of Animal Science 33, No. 3, 587-591 (September 1971)

Using 2- or 3-day-old Yorkshire pigs, the authors conducted three experiments (1) to determine the acceptability of fish protein concentrate (FPC) as the sole source of protein in liquid diets for baby pigs and (2) to compare the growth performance of baby pigs fed diets containing casein, FPC (isopropyl-extracted whole red hake containing from 80 to 85% crude protein), or isolated soy protein (ISP) incorporated in the diets at isonitrogenous levels.

In experiment 1, which lasted 18 days, gains were related to net caloric consumption. Pigs fed commercial sow-milk replacer averaged 0.15 lb./day gain; those fed homogenized, pasteurized, vitamin-D-fortified cow's milk averaged 0.12 lb./day gain; and those fed FPC as the sole source of protein averaged 0.10 lb./day gain. The FPC was well accepted and was apparently free of toxic factors. In experiment 2, which lasted 21 days, casein, FPC, and Swedish FPC were fed at the 33% dietary dry-matter level. Feed efficiency (gain-to-feed ratio) and daily gains were quite similar for all three protein sources, averaging 0.71 and about 0.15 lb./pig/day, respectively. Experiment 3 was similar to experiment 2 except that ISP was fed instead of the Swedish FPC. It did not give as good gains as either of the other

## ECONOMIC UTILIZATION OF CRUSTACEAN MEALS

Meyers, Samuel P., and James E. Rutledge (Department of Food Science, Louisiana State University, Baton Rouge, La. 70803)  
Feedstuffs 43, No. 43, 46 (October 16, 1971)

In the fish and shellfish industries, vast amounts of potentially valuable animal protein have been either discarded as waste or put to minimal use as animal feed or low-cost fertilizer. (See Environmental Protection Report 12060 ECP04/70 "Current Practice in Seafoods Processing Waste Treatment" for a summary of the problem.) Because processing of blue crab and fresh-water crawfish, both commercially important food fish, has posed a significant waste problem in Louisiana, Sea Grant programs at the state university are being directed toward development of more efficient methods for recovering additional byproducts from the wastes.

Waste (shell and viscera, and the flesh attached to both) may account for more than 80% of the total weight of crawfish and blue crab. Once the chitinous nitrogen has been removed, meals made from these wastes have an overall biological value equal to, or even higher than, that of soybean or fish meal. (See the article by Lovell et al. abstracted in Commercial Fisheries Abstracts 21, No. 11, p. 17.) Studies on the chemical composition and nutritive value of crab meals (Kifer et al., abstracted in Commercial Fisheries Abstracts 22, No. 5, p. 3) have shown that these meals effect growth rates in broilers equivalent to those effected by a commercial formula, a menhaden meal, and a methionine-supplemented corn-soybean meal. However, the large proportion of exoskeleton (chitin, protein associated with chitin, and calcium carbonate) in crustacean meals has deleterious effects (over)

## FISH PROTEIN CONCENTRATE: A NEW SOURCE OF DIETARY PROTEIN

Stillings, B. R., and G. M. Knobl, Jr. (National Center for Fish Protein Concentrate, College Park, Md. 20740)  
Journal of the American Oil Chemists' Society 48, No. 8, 412-414 (August 1971)

This article is a brief review of the development of fish protein concentrate (FPC), it points out some of the problems related to the production and use of FPC, and it reports on progress that has been made in solving some of these problems. [7 references]

Sterilized fish eggs are converted (mechanically) to a defatted product. FFP

Food Technology 25, No. 10, 66 (October 1971)

Mori, Y. et al. (pat.)  
Japanese Patent 16133/71

6.54 FISH EGG PRODUCT

This apparatus is used for counterflow solvent extraction of fish to produce a defatted fish protein of acceptable color and taste.

Österman, S.; Acta Nutrition Aktiebolag (pat.)  
U.S. Patent 3,565,634  
Food Technology 25, No. 7, 78 (July 1971)



Klenz, K.-L., W. Münkner, and H.-J. Papenfuss (VEB Volkswirtschaft Stralsund) (pat.)  
West German Patent Application 1,492,966 (1969) (In German)  
Food Science and Technology Abstracts 3, No. 3, 3R113, 502 (March 1971)

Fresh, salted, or frozen roe that has been thawed is washed and comminuted twice, the last time as finely as possible so that the liquid in the individual roe grains will be released. The liquid is then dried.

Nuruki, Hidetaru, and Yoshimichi Iwamoto (Kanegafuchi Spinning Co., Ltd.) (pat.)  
Japanese Patent 70 23620  
Chemical Abstracts 74, No. 20, 100943f (May 17, 1971)

## 6.86 SKIN-PROTECTIVE DETERGENTS

Donuts).

This is an azeotropic process for rendering fatty foods (meat, fish, coconuts).

## FATTY FOOD RENDERING

6.59 (1.80) on their overall nutritional value. The high levels of calcium are a particular problem.

The last part of this report describes a method for decalcifying blue crab and crawfish waste. The crude crustacean material is dried to a moisture level of 8% or less, ground through a mill with a  $\frac{1}{2}$ -in. screen, and sieved through a 12 mesh screen. The efficiency of the method is shown in the table below.

"Waste" constituent	Percentage of each constituent in						Processing efficiency (%)	
	Preprocessed waste of		Processed meal from		Crab	Crawfish	Crab	Crawfish
	Crab	Crawfish	Crab	Crawfish				
Skeletal material*	80.2	75.4	21.6	15.5			73.0	79.0
Calcium	17.0	18.0	7.5	5.7			55.9	68.3
Phosphorus	1.7	1.2	1.4	0.9				
Chitin	12.9	12.5	2.6	2.1				
Ash	56.0	44.0	20.5	16.8				
Moisture	4.5	5.7	8.2	6.4				
Fat	2.0	4.4	2.7	6.0				
Protein**	24.0	28.1	58.4	58.5				

*Percent of total dry material	**Corrected for chitin
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Since this method removes a high percentage of skeletal material, reduces the calcium level significantly, improves the calcium-to-phosphorus ratio, and notably increases the protein content, it should lead to incorporation of larger quantities of crustacean meals into rations for monogastrics. Thus utilization of crustacean products should become more economical. The authors suggest that waste-drying plants strategically located in shellfish-processing areas could serve several small processors, functioning as a central meal-producing center for the manufacture of high-quality animal protein. [1 figure, 2 tables] LB

6.54 SURVIVAL OF MICROORGANISMS IN FISH PROTEIN CONCENTRATE

STORED UNDER CONTROLLED CONDITIONS

Goldmintz, Daniel (National Marine Fisheries Service, National Center for Fish Protein Concentrate, College Park, Md.)

Developments in Industrial Microbiology 12, 260-265 (1971)  
Government Research Announcements 71, No. 19, 40 (October 10, 1971).

Fish protein concentrate, inoculated with *Salmonella montevideo*, *Staphylococcus aureus*, and a *Bacillus* sp., stored at 35 °C for four months at constant relative humidities. The numbers of *S. montevideo* and *S. aureus* dropped sharply as the moisture increased whereas the *Bacillus* sp. decreased slowly over the study period with little change at different humidities. The initial extremes mold count was near zero but proliferation occurred rapidly at high humidity. (NOAA)

Reprinted

sugar solution and then cooking it in the solution. Reprinted

The storage life of medium-water-content, plastic animal foods (not canned) consisting mainly of meat or fish may be significantly improved by preserving the

Somm, H.: Roco Conserven Rorschach, Switzerland (pat.)  
British Patent 1,231,110  
BEMIRA Abstracts 24, No. 7, Abstract No. 2188-450 (July)

# PROCESS FOR PREPARING ANIMAL FOODSTUFFS CONTAINING MEAT

## COLLAGEN-COATED FOODSTUFFS, PARTICULARLY SAUSAGES

Taylor, K. W., and N. J. Bradshaw; Unilever Ltd. (pat.)

BEMIRA Abstracts 24, No. 7, Abstract No. 2209, 454 (July 1971)

Collagen dough is extruded in a tubular form and the sausage meat is simultaneously extruded in a form such that it may receive the collagen continuously. The collagen is then set in a brine setting bath and tanned with dialdehyde alginate acid. The collagen casings so prepared are very thin and tender to eat.

Reprinted

LB

problems created by some commercial formulations.

From these results, the authors conclude that FPC is equal to casein and superior to ISP as the sole source of protein in liquid diets fed to pigs for the first 3 weeks of their life. [5 tables, 18 references]

In the November 6, 1971, issue of *Feedstuffs* (Vol. 43, No. 46, page 47), S. H. Morrison, Ph.D., D.V.M., reviews this report. He suggests that the authors' conclusions should be qualified, since the gains of the pigs were not particularly outstanding. His experience has indicated that neither FPC, casein, nor soy protein (isolated or treated) should be used as the sole source of protein for baby, nearly weaned animals. Overuse of some ingredients in animal diets often causes poor growth, scouring, and proneness to disease due to poor health and lowered resistance. He believes that diets combining properly treated soy protein, FPC, and properly processed milk protein byproducts are the best means of avoiding many problems created by some commercial formulations. LB

**two protein sources.**



Law, Stephen L. (College Park Metallurgy Research Center, U.S. Department of the Interior, Bureau of Mines, College Park, Md. 20740) Science **174**, No. 4006, 285-287 (October 15, 1971)

This report summarizes available tests on the use of the commercially available chelating resin, Ionac SRXL, for collecting mercury from aqueous solutions. Comparison was made between the behavior of the new resin in a column and its behavior in resin-loaded paper. The resin selectively and quantitatively collects methyl mercuric forms and inorganic mercuric forms of mercury to the exclusion of all the other metals studied ( $\text{Fe}^{3+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$ ), except the noble metals. The mercury (in both forms) can be collected at pH from 1 to 9. The mercury is readily eluted from the resin with a slightly acid, 5% solution of thiourea; the resin can be reused. The resin-loaded paper (consisting of 50% resin and 50% cellulose) shows properties similar to those of the loose resin.

The author suggests that the ability of this resin to selectively and quantitatively collect the highly toxic methyl mercury, as well as inorganic mercuric salts, and the ability to be reused for many cycles makes the resin a promising tool for analysis and for the recovery of mercury from industrial and natural aqueous solutions. [1 figure, 1 table, 4 references] FTP

Majorack, F. C. (Division of Compliance Programs, Bureau of Foods, Food and Drug Administration, Washington, D.C. 20204) Food Technology **25**, No. 10, 38-40, 42 (October 1971)

In order to encourage food processors to use quality assurance techniques to achieve compliance with the Food, Drug, and Cosmetic Act, the Food and Drug Administration (FDA) is now administering two projects under its Cooperative Quality Assurance Program. They are being administered under FDA's Office of Compliance. The first, the Quality Assurance Self-Certification Project is operational; the second, the Quality Assurance Systems Development Project is in its pilot phase.

The Self-Certification project entails an agreement between a plant and FDA, and the state of jurisdiction when it wishes to become a participant. The agreement details duties and responsibilities of participants explicitly and provides specifications of performance. The System Development project involves a segment of industry (for example, the pickle packers, the breaded onion ring producers) under the leadership of such segment's association. The covenant for this project requires only a letter of interest to participate and an understanding of the need to cooperate with the protocols of the project.

Details of the projects are described in the article.

FTP

Trust, T. J. (Department of Bacteriology and Biochemistry, University of Victoria, Victoria, British Columbia) Journal of the Fisheries Research Board of Canada **28**, No. 8, 1185-1189 (August 1971)

Two diets that were formulated and offered for the commercial production of fish were examined microbiologically. The total count of aerobic bacteria of the diets ranged from  $10^3$  to  $10^7$  bacteria per gram. The commercial fish diets contained psychrophilic and thermophilic bacteria and up to  $10^4$  aerobic and anaerobic spore-forming bacteria per gram. Enterococci and members of Enterobacteriaceae (including species of *Salmonella*) were also found in the diets. Eighteen of the 47 samples tested contained fluorescent pseudomonads. Proteolytic, amylolytic, lipolytic, and haemolytic bacteria were present in measurable numbers. The total viable aerobic count did not change markedly when samples of the diets were stored at 4°, 20°, or 30° C.

The author suggests that consideration should be given to pelleting fish rations under conditions that achieve pasteurization. Furthermore, he suggests that consideration should be given to applying the more vigorous sanitary procedures developed by the dairy and poultry industries in the management of fish hatcheries. [1 table, 16 references] FTP

Saito, Mamoru, Kohichiro Ohtsubo, Makoto Umeda, and Makoto Enomoto (Department of Carcinogenesis and Cancer Susceptibility, Institute of Medical Science, University of Tokyo, Shirokanedai, Minato-ku, Tokyo, Japan); Hiroshi Kurata, Shun-ichi Udagawa, Fumi Sakabe, and Masakatsu Ichino (National Institute of Hygienic Sciences, Kamiyoga-1-chome, Setagaya-ku, Tokyo) Japanese Journal of Experimental Medicine **41**, No. 1, 1-20 (1971)

Among the substances in foodstuffs that have been identified as carcinogenic are some mycotoxins, hepatotoxins, luteoskyrin and cyclochlorotene (chlorine-containing peptide) isolated from the metabolites of rice fungus, and aflatoxins isolated from fungi grown on peanuts and cereals. Many fungi naturally affect crops in the field and foodstuffs in storage; some are applied as fermenting agents during processing; and many produce carcinogenic metabolites that consumers could easily ingest unawares. Therefore, the authors developed a mass-screening method for detecting mycotoxin-producing fungi in foods. First they collected more than 800 fungi from various foods (rice, wheat, flours, beans, fermented soybean paste, soy sauce, mash, vegetable pickles, and dried fish) commonly eaten in areas where the mortality rate from cerebrovascular and hepatic diseases is high. Then they separately cultured 133 of them and screened them for toxicity with HeLa cells and mice. Nine strains were toxic to both; 15 were toxic to HeLa cells only; and 25 were toxic to mice only.

The method, which depends on in vitro cells, can be used (along with chemical fractionation and detection of the toxic principles) for the bioassay of relatively











ÜBER THYNNIN, DAS PROTAMIN DES THUNFISCHES. IX. MITTEILUNG  
ÜBER DIE STRUKTUR DER PROTAMINE IN DER UNTERSUCHUNGSREIHE VON  
E. WALDSCHMIDT-LEITZ UND MITARBEITERN  
[PROTAMINES FROM THE STUDIES OF E. WALDSCHMIDT-LEITZ ET AL.  
IX: THYNNIN, THE PROTAMINE OF TUNA FISH]

IX: THYNNIN, THE PROTAMINE OF TUNA FISH]

Bretzel, Günther (Chemische Abteilung des Heiligenberg-Instituts, Heiligenberg, und Institut für Organische Chemie der Technischen Universität München)  
Hoppe-Seyler's Zeitschrift für Physiologische Chemie 352, No. 7, 1025-1033 (July 1971) (In German; English summary)

Separation (by column chromatography on CM-Sephadex C-25) of the protamine of tuna into four fractions revealed that all four have the same end amino acids, proline at the N-terminal, and four residues of arginine at the C-terminal. Y1 and Y2 have the same amino-acid composition, Arg20:1ThrSer2GlxPro2Ala3Val3Tyr; Z1 has the composition Arg21 $\pm$ 1ThrSer3Pro2AlaVal4Tyr; Z2 has the composition Arg21 $\pm$ 1ThrSer3Pro2Ala2Val3Tyr. The exact contents of arginine were not determined. 7 figures, 2 tables, 15 references]

[7 figures, 2 tables, 15 references]

8-51  
(9.13) LEVELS AND DYNAMICS OF SOME NITROGEN FRACTIONS IN THE MUSCLE TISSUE OF FISHES. II. EXTRACTIVE SUBSTANCES AND PROTEINS SOLUBLE AND INSOLUBLE IN 0.6M POTASSIUM CHLORIDE

Chemical Abstracts 75, No. 11, 73026w (September 13, 1971)

### 8.5 AMINO ACID AND FATTY ACID COMPOSITION OF TISSUES OF THE DUNGENESS CRAB (CANCER MAGISTR)

Allen, W. V. (Department of Biology, Humboldt State College, Arcata, Calif. 95521) Journal of the Fisheries Research Board of Canada 28, No. 8, 1191-1195 (August 1971)

Six tissues (skeletal muscle, hepatopancreas, exoskeleton, gonads, hemolymph, and viscera) of the Dungeness crab were examined for their content of total lipid, protein, amino acids, fatty acids, and glucosamine. All tissues except the exoskeleton showed balanced amino-acid compositions. The exoskeleton was deficient in the amino acids arginine and lysine. Palmitic, palmitoleic, oleic, eicosapentaenoic, and docosahexaenoic acids were the major fatty acids in all six tissues. [3 tables, 22 references]

issues, [3 tables, 22 references]

Japan)  
Chemical Abstracts 74, No. 11, 51105y (March 15, 1971)

**FISH EGG PROTEINS**

8.53 LIPIDS OF THE MARINE UROCHORDATE PYURA CHILENSIS

Alfonso Saiz, Mariamela (Univ. Chile, Santiago, Chile)  
Chemical Abstracts 75, No. 13, 85706f (September 27, 1971)

### 8.51 FISH EGG PROTEINS

## FISH EGG PROTEINS

(6.54)

Japan)

Chemical Abstracts 74, No. 11, 51105y (March 15, 1971)

issues. [3 tables, 22 references]

Six tissues (skeletal muscle, hepatopancreas, exoskeleton, gonads, hemolymph, and viscera) of the Dungeness crab were examined for their content of total lipid, protein, amino acids, fatty acids, and glucosamine. All tissues except the exoskeleton showed balanced amino-acid compositions. The exoskeleton was deficient in the amino acids arginine and lysine. Palmitic, palmitoleic, oleic, eicosapentaenoic, and docosahexaenoic acids were the major fatty acids in all six tissues. [3 tables, 22 references]

FISH ODOOR OF COOKED HORSE MACKEREL

Shimomura, Michiko, Fujiko Yoshimatsu, and Fumiko Matsumoto (Ochanomizu University, Daigaku, Tokyo, Japan)  
 Chemical Abstracts 75, No. 9, 62292d (August 30, 1971)

Wuensche, Joachim, and H. D. Bock (Oskar-Kellner-Inst. Tierernaehr., Dtsch. Akad. Landwirtschaftswiss., Berlin, Germany)  
Chemical Abstracts 75, No. 1, 4100d (July 5, 1971)

7.89  
(6.195)

### 7.9 A SIMPLE FIELD TECHNIQUE FOR OBTAINING SMALL SAMPLES OF MUSCLE FROM LIVING FISH

Uthe, J. F. (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba, Canada)  
Journal of the Fisheries Research Board of Canada 28, No. 8, 1203-1204 (August 1971)

This notedescribes a rapid technique that can be easily used in field tests for obtaining small samples of muscle from living fish. The sampling technique was devised for use in testing the mercury content of the same fish over various intervals of time. A Silverman biopsy needle is used for obtaining samples of approximately 40 mg. in weight. In tests with fish held in aquaria and biopsied periodically, the authors found the survival rate of the fish to be excellent. Furthermore, the precision of results obtained on the quantitative analysis of mercury on multiple biopsy analysis was as good as that obtained when the analyses were carried out on excised portions of the muscle.

[2 figures, 3 references]

FIP

FIP

compared with use of light intensities of 500 lux at 0.5 m (12.7 ft) [4 figures, 12 tables, 3 references]

at pH 7.5 to 8.0, (3) use of aeration for providing the necessary CO<sub>2</sub> to the cultures (instead of ventilation) and the use of gaseous CO<sub>2</sub> (instead of bicarbonate) as the source of CO<sub>2</sub> to minimize salt effects, and (4) use of light intensities of 500 ft.-c. (5,370 lux) to reduce growth rates of *S. capricornutum* in bottle tests as compared with use of light intensities of 350 ft.-c. (3,760 lux).

7.9 (9.19)



8.59  
(0.39)

STERIODS OF A CHONDROSTEAN: CORTICOSTEROIDS AND TESTOSTERONE  
IN THE PLASMA OF THE AMERICAN ATLANTIC STURGEON, ACIPENSER  
OXYRHYNCHUS MITCHILL

Sangalang, G. B., M. Weisbart, and D. R. Idler (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
Journal of Endocrinology 50, No. 3, 413-421 (July 1971)

Using double isotope derivative assays, the authors were able to detect sub-microgram levels of testosterone in the free steroid fractions of the plasma from both mature and immature male Atlantic sturgeon. The level was much the higher in the mature fish. They detected no enzyme-released testosterone in the plasma of the immature fish during the preliminary analysis for conjugated testosterone; however, they did find very low levels of free cortisol, cortisone, and corticosterone. No 11-deoxycorticosterone or 11-deoxycortisol could be definitely established in the plasma of either fish. [3 tables, 19 references]  
LB

Chemical Abstracts 75, No. 3, 16838p (July 19, 1971)

8.59 ISOLATION OF DNA ALKALI METAL SALT FROM SOFT ROE OF FISH

Ichino, Motonobu, Sada Kanai, and Chiaki Yamashita (Kojin, Ltd.) (pat.)  
Japanese Patent 71 08,310

Chemical Abstracts 75, No. 3, 16838p (July 19, 1971)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 27

8.8  
(1)

OCTOPINE IN POSTMORTEM ADDUCTOR MUSCLE OF THE SEA SCALLOP  
(PLACOPECTEN MAGELLANICUS)

Hiltz, Doris Fraser, and W. J. Dyer (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 28, No. 6, 869-874 (June 1971)

Octopine (N<sup>ω</sup>-(1-carboxyethyl)-arginine) was first reported in scallop muscle in 1937 by Moore and Wilson. They found a concentration of about 1% in muscle that had been iced for 4 or 5 days. Some 2 years later, Irvin and Wilson noted that fresh scallop muscle contained no octopine, arginine accounting for about 90% of the total guanidine bases there. However, after the muscle had been stored for 3 days at 0° C., they found that the arginine decreased as the octopine increasingly appeared. Their conclusion was that arginine is the precursor of octopine. In 1959 and in 1961, van Thoi and Robin reported that octopine is formed biosynthetically in the muscles of certain mollusks, the general reaction being:



They also reported that lactic dehydrogenase activity in mollusks that synthesize octopine (mainly cephalopods and a few lamellibranchs and gastropods) is very weak or nonexistent. Results of the present study confirm these earlier findings. They also corroborate observations by several investigators that glycolysis and nucleotide degradation are related, for glycolysis and resultant octopine formation occurred concomitantly with ATP dephosphorylation. The time course of octopine formation can be represented by a pH curve; within the limits of pH 7.2-6.0, the formation of octopine is linearly related to the decrease in muscle pH.

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 27

9.11

DEPOSITION OF EXTRATERRESTRIAL NICKEL IN MARINE SEDIMENTS

Yamakoshi, Kazuo, and Yuji Tazawa (Department of Physics, Faculty of Science, University of Kyoto, Kyoto, Japan)  
Nature 233, No. 5321, 542-543 (October 22, 1971)

The nickel component in marine sediments is considered to be furnished by (1) grain settling and (2) ionic (or colloidal) sedimentation. The settled grains are brought by extraterrestrial sources, and by continental and volcanic sources. The ionic and colloidal nickel fractions are of authigenic origin in sea water and are obtained primarily from terrestrial sources. By the hypothesis of H. Pettersson and H. Rotschi [Geochim. Cosmochim. Acta 2, 81 (1952)], a large amount of the nickel fraction of marine sediments is expected to be supplied through grain (meteoric dusts) into marine sediments. In the present analysis, the authors conclude that the nickel fraction supplied through grain settling is negligibly small, and that the extraterrestrial nickel fraction is supplied through magnetic spherules found in the sediment).

FTp

Chemical Abstracts 74, No. 23, 122044r (June 7, 1971)

9.13 DYNAMICS OF THE RESISTANCE OF STURGEON TO PHENOL  
(9.19) IN THE EARLY STAGES OF ONTOGENESIS

Kokoza, A. A. (Tsentr. Nauchno-Issled. Inst. Osetrovogo Khoz., Astrakhan, U.S.S.R.)  
Chemical Abstracts 74, No. 23, 122044r (June 7, 1971)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 27

9.125  
(1.9)

REFLECTING SPHERES IN THE EYES OF WEAKFISHES (SCIAENIDAE)

Arnett, H. J. (Department of Botany and Cell Research Institute, University of Texas at Austin, Tex.), J. A. C. Nicol (University of Texas Marine Science Institute, Port Aransas), and C. W. Querfeld (High Altitude Laboratory of the National Center for Atmospheric Research, Boulder, Colo.)  
Nature 233, No. 5315, 130-133 (September 10, 1971)

Unlike the reflecting material that occurs in the eyes of teleosts, that in Sciaenidae is a lipid rather than guanine. A variety of examinations of this reflecting layer (tapetum lucidum) in pigment epitheliums removed from Cynoscion arenarius and C. nebulosus revealed that it is a triglyceride. Its chromatographic behavior is well separated from that of phospholipids, sphingomyelin, cerebroside, monopalmitins, dipalmitins, cholesterol, cholesteryl esters, waxes, and diacyl glyceryl ethers; it shows one major peak corresponding to n-C22:6, which makes up 95% or more of the fatty acids present. Because of the rate at which it runs on thin-layer chromatography and the similarity of its infrared spectrum with that of authentic tridocosahexanoic, the authors conclude that the reflecting material in the eyes of seatrout consists almost exclusively of tridocosahexanoic.

LB

Chemical Abstracts 75, No. 5, 31899c (August 2, 1971)

PHYSIOLOGY OF FISH PARASITES

Arme, C., and M. Walkey (Dep. Zool., Queens' Univ., Belfast, N. Ireland)  
Chemical Abstracts 75, No. 5, 31899c (August 2, 1971)

LB



Lythgoe, J. N. (MRC Vision Unit, University of Sussex)  
 Nature 233, 205-207 (September 17, 1971)

Corneal iridescence (not to be confused with iridic iridescence) was studied by means of an inclinometer in Indian Ocean fishes. Angles of pitch (the inclination around an axis joining the eyes) and roll (the inclination around an axis joining the head and the tail) were measured at 15- to 25-m. depths at about noon. No iridescence was visible from below or from somewhat in front of the fishes' heads. The color, which varies from an unsaturated red to a saturated blue-green, was rarely the same as that of the head; nor did it correlate with that of the water in which the fish live. The corneas of silvery-sided pelagic fishes were not iridescent. Since all the fishes that did show corneal iridescence live and feed near the bottom, the author concludes that the iridescence acts as a shade to reduce the bright light that comes from the upper atmosphere; this shade has little effect on the much dimmer light that comes from the direction of the sea bed. [2 figures, 1 table, 6 references]

bed. [2 figures, 1 table, 6 references]

Lebedinskiĭ, N. A. (Inst. Gidrobiol., Kiev, U.S.S.R.)  
Chemical Abstracts 74, No. 21, 108747r (May 24, 1971)

9.13 DYNAMICS OF QUANTITATIVE CHANGES IN TRACE ELEMENTS IN CARP  
(9.16) AS A RESULT OF THE ACTION OF ALGICIDAL DOSES OF POLYMETALLIC  
PRODUCTS AND ZINC FILTER CAKE

9.11  
(9.7)

Rakestraw, Norris W.  
Technical Report ONRNL-15-66, 33 pp. (May 11, 1966) (Office of Naval Research, London, England) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-484 759. PC\$3.00; MF\$0.95.

Government Research Announcements 71, No. 17, 99 (September 10, 1971)

A listing of the places in Europe where work in chemical oceanography is being done and the people who are doing it is presented. The nature of the work is briefly described in each case. (Author) Reprinted

Reprinted

Preston, Eric M. (Dep. Zool., Univ. Hawaii, Honolulu, Hawaii)  
Chemical Abstracts 75, No. 5, 30918w (August 2, 1971)

9.13  
(1.81)(9.19)  
IMPORTANCE OF INGESTION IN CHROMIUM-51 ACCUMULATION  
BY CRASSOSTREA VIRGINICA

9.13  
(8.50) ANALYSIS OF SEASONAL HISTOCHEMICAL CHANGES IN THE LIVER  
OF THE PIKE PERCH, LUCIOPERCA LUCIOPERCA  
Agdavllecova, A. T. (U.S.S.R.)  
Chemical Abstracts 74, No. 21, 108653g (May 24, 1971)

Agdavljetova, A. T. (U.S.S.R.)

8.53 COMPOSITION OF FATTY ACIDS IN THE NEUTRAL LIPIDS OF SPRING- AND FALL-BREEDING BALTIC HERRING ROE, FINGERLINGS, AND ADULTS IN THE GULF OF RIGA OF THE BALTIC SEA  
(9.12)(9.13)

Shatunovskii, M. I. (Mosk. Gos. Univ., 1m, Lomonosova, Moscow, U.S.S.R.)  
Chemical Abstracts 74, No. 21, 108796f (May 24, 1971)

Chemical Abstracts 74, No. 21, 108796f (May 24, 1971).

LB

Ion-exchange chromatography of purified dipeptidase from sea-frozen cod muscle yielded two distinct fractions. The pH dependence of the two peaks, and their extent of hydrolysis with different substrates, their activity toward Leu-Gly-Gly, their molecular weight, and the extent to which their dipeptidase activity was inhibited by simple amino acids led the author to conclude that cod muscle contains two distinct forms of dipeptidase.

Naus, Kathleen M. (Lehrstuhl für Biologische Chemie und Ernährungswissenschaft, Universität Hohenheim, Württ. D-7 Stuttgart 70, Garbenstrasse 30, West Germany)  
Hoppe-Seyler's Zeitschrift für Physiologische Chemie 352, No. 5, 665-673 (May 1971)  
(Walter de Gruyter and Co., 1 Berlin 30, Genthiner Str. 13, Berlin-West 10307)

59 TWO FORMS OF DIPEPTIDASE IN COD MUSCLE

## 8.7 LIST OF VOLUNTARY PRODUCT STANDARDS, COMMERCIAL STANDARDS, AND SIMPLIFIED PRACTICE RECOMMENDATIONS

Anonymous  
Revision of report, COM-70-50039 (January 1970), 15 pp. (January 1971) (National Bureau of Standards, Washington, D.C.) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. COM-71-90007; PC + MF\$0.95.

Government Research Announcements 71, No. 13, 38 (July 10, 1971)

The publication is intended to assist producers, distributors, consumers, students, and others desiring to obtain copies of Voluntary Product Standards, Commercial Standards, Simplified Practice Recommendations, and Tentative Standards. It contains a classified index of the standards available, and instruction for ordering them. (Author) Reprinted

Reprinted

content is limited to use as a confirmation of freshness during the short-term storage period only. [5 figures, 1 table, 19 references] LB

To test the value of octopine content as an index of quality in scallop meat, the authors plotted taste panel scores against octopine content. Although the regression line showed a highly significant ( $p < 0.001$ ) linear relation, it also indicated that octopine production reaches the maximum considerably sooner than the scallop meat becomes inedible. Therefore, the authors conclude that octopine content is limited to use as a confirmation of freshness during the early post-

8.8 (1.84)



Ridgway, Sam H. (Anatomy School, Downing Street, Cambridge, England) *Nature* 232, No. 5306, 133-134 (July 9, 1971)

The author comments on the hypothesis of R. Clarke [Norsk Hvalfangsttid, No. 10, 589 (1955)] that the spermaceti of the sperm whale serves as a buoyancy regulator by cooling as the whale dives into sea water of greater density. He points out that Clarke's hypothesis specifies several physiological events not observed in other diving animals: (1) dilation of the skin blood vessels when the dive is commenced, (2) cessation of bradycardia and vasodilation while the animal is still at depth, and (3) passage of water into the nares. The first two events, the author suggests, appear to be contrary to the oxygen-conserving mechanisms that are primary factors in allowing for prolonged diving. Furthermore, he points out, the food (primarily squid) taken during the deep dives of the whale is in thermal equilibrium with the environment (which is colder at the lower depths) and poses an additional heat drain in the whale (an event not previously considered).

In a letter to the journal, R. Clarke indicated that he will comment in detail the author's points in an article to be published later, but he did make a few comments that were printed at the end of the present article.

[1 figure, 6 references]

FTP

(9.19)

Nightingale, Charles H. (Division of Pharmaceutics, School of Pharmacy, University of Connecticut, Storrs, Conn. 06268), and Milo Gibaldi (Department of Pharmaceutics, School of Pharmacy, State University of New York at Buffalo, Buffalo, N.Y. 14214) *Journal of Pharmaceutical Sciences* 60, No. 9, 1360-1363 (September 1971)

The model developed by Levy and Gucinski (reported in *J. Pharmacol. Exp. Ther.* 146, 80 (1964)) to describe the uptake by fish of drugs and toxic chemicals has certain limitations. It predicts that when reciprocal time of occurrence of pharmacological effect (time of death or overturn time) is plotted against drug concentration of the solution in which the fish are immersed, the plot will be linear and pass through the origin. Although it successfully describes the time course of the pharmacological effects on goldfish of several drugs, it does not allow for toxicity thresholds. As early as 1917, Powers reported that he had found a number of positive concentration intercept values in plots of reciprocal time of death versus concentration for a variety of drugs and toxic substances. He therefore postulated that every toxic substance has a concentration below which it will produce no pharmacological response, regardless of exposure time. He designated this concentration the threshold of toxicity.

The present authors extend the Levy-Gucinski kinetic model of pharmacological effect in the goldfish to situations where an apparent threshold of toxicity exists. Using 4-aminoantipyrine, they found that at high concentrations, drug-induced overturn apparently follows the early model. But at low concentrations, the plots will be hyperbolic rather than linear. The results suggest that the

(over)

Hastings, W. H. (U.S. Department of the Interior, Fish Farming Experimental Station, Stuttgart, Ark.), S. P. Meyers, and D. P. Butler (Department of Food Science, Louisiana State University, Baton Rouge, La.) *Feedstuffs* 43, No. 47, 38 (November 13, 1971)

Fish feeds must be formulated and processed so that they are stable while in water until they are consumed. The essential nutrients of dry compressed fish feeds are often not available to fish because the soluble components may leach into the water or the ingredients may flake off. Furthermore, these components and ingredients may eventually affect the quality of the water. The present article describes some tests carried out by the authors on modifying the formulas for fish feeds and the processes for their manufacture. They suggest that application of pelleted feeds to shrimp culture appears particularly promising. The following table lists basic formulas for fish and shrimp feeds.

(over)

Ringrose, R. C. (Department of Animal Sciences, University of New Hampshire, Durham, N.H. 03824) *Journal of the Fisheries Research Board of Canada* 28, No. 8, 1113-1117 (August 1971)

This article reports on the energy requirement and calorie-to-protein ratio for the brook trout. Salmonoid fishes need diets high in protein. To make sure that the fish does not metabolize a substantial amount of protein for energy, we must formulate feeds that are based on knowledge of the energy requirements of the various salmonoid species. Information on the energy requirements at a given protein level would help establish a calorie-to-protein ratio in the diet that would provide proper balance between the energy and protein in a trout feed. Furthermore, calorie-to-protein ratio information would be applied to formulation of feeds for these fishes when the energy content or protein level is changed. The temperature of the water environment influences the protein and energy requirements of trout and so calorie-to-protein ratios would have application for different water temperatures.

The author found that the brook trout required about 75 kcal. of metabolizable energy for each 1% of protein in the feed (based upon a kilogram of feed). Additional feed energy (greater calorie-to-protein ratios) reduced weight gained by the trout but did not significantly increase fat content of the dry carcass.

The trout was able to use the carbohydrate and protein of wheat middlings.

(over)



[see references 4] tables, 2

Used by the Fish Farming Experimental Station, Stuttgart, Ark.  
May 2/71  
Specially processed at a feed mill to provide desired particle size, condition, and surface area.

Basic shrimp feed %	Paste feed for eels %	Standard fish feed %	Ingredients
--	--	1	Vitamin premix
02	--	--	Wheat flour
02	02	--	Potato starch
--	41	01	Rice byproducts fraction
--	--	35	Rice bran
01	--	4	Alfalfa meal
--	11	8	Distillers solubles
--	--	5	Poultry byproducts meal
01	--	5	Feather meal
02	19	--	Soybean flour (50% protein)
--	--	02	Soybean meal (50% protein)
01	13	--	Shrimp meal
01	23	--	Fish meal
--	--	21	Fish (menhaden) meal (60% protein)

Feed formulas for fish and shrimp

41.6

9.17 A SYSTEMS VIEW OF FISHERY MANAGEMENT  
(1.120) WITH SOME NOTES ON THE TUNA FISHERIES

Rothschild, B. J. (Center for Quantitative Science in Forestry, Fisheries and Wildlife and Fisheries Research Institute, University of Washington, Seattle, Wash.)

FAO Fisheries Technical Paper No. 106, 111 + 33 pp. (August 1971)

Since systems analysis is a technique for investigating complex problems, and we acknowledge the complexity of the fishery management problem, it seems quite appropriate to apply this sort of analysis to fishery management. It is most difficult in a paper as short as this to detail a systems analysis of fisheries in general, or even to detail an analysis for a group of fisheries such as the tuna fisheries. Instead of detailing an analysis, we will try and provide an exposition on the approach to such an analysis, and in so doing, we will be primarily concerned with some necessary prolegomena and an elucidation of some of the structures and techniques that might be involved in an analysis. Our general theme will be that we are taking too narrow a view of fishery management.

From author's introduction

114 [see references 11 tables, 4] for the trout than was glucose.

Also, the trout metabolized for energy a toasted cereal product composed of 80% corn and 20% wheat. Delactosed dried whey was less effective as an energy source

41.6

9.13 CHEMORECEPTION IN THE LATERAL-LINE ORGANS OF TELEOSTS

Katsuki, Yasuji, Toru Hashimoto, and James I. Kendall (Lab. Sens. Sci., Univ. Hawaii, Honolulu, Hawaii)

Chemical Abstracts 75, No. 3, 16834j (July 19, 1971)

114

[see references 4, 5]

... of the lateral line organs of teleosts. The purpose of this study was to determine the magnitude of the changes in the lactic acid concentration of the blood of the alewife when the fish passes through a pool and weir fishway. The lactic acid concentration of the blood of anadromous alewives during their passage through a pool and weir fishway was not extremely high (46.7 mg./100 ml.) and the degree of exercise they exhibited during their ascent was considered moderate. Only one group of fish, out of three groups sampled directly from the fishway pools, had an average concentration of lactic acid in the blood that differed significantly from that for the rested state.

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SEMI-ANNUAL REPORT

41.6

9.13 CHANGES IN BLOOD LACTIC ACID CONCENTRATIONS IN ALEWIVES  
(9.16) (ALOSA PSEUDOHARENGUS) DURING PASSAGE THROUGH A POOL AND WEIR FISHWAY

Dominy, C. L. (Resources Development Branch, Fisheries Service, Department of the Environment of Canada, Halifax, Nova Scotia)

Journal of the Fisheries Research Board of Canada 28, No. 8, 1215-1217 (August 1971)

... of the lateral line organs of teleosts. The purpose of this study was to determine the magnitude of the changes in the lactic acid concentration of the blood of the alewife when the fish passes through a pool and weir fishway. The lactic acid concentration of the blood of anadromous alewives during their passage through a pool and weir fishway was not extremely high (46.7 mg./100 ml.) and the degree of exercise they exhibited during their ascent was considered moderate. Only one group of fish, out of three groups sampled directly from the fishway pools, had an average concentration of lactic acid in the blood that differed significantly from that for the rested state.

FTP

114

[see references 11 figures, 1 table, 6] by digital computer are given for a variety of conditions.

overturn in goldfish is absorption-rate limited. Calculations and results obtained

(41.6) 41.6



9.15  
(9.16)

METHOD OF FISH CULTURE

Marking, Leif L. (Onalaska, Wis. 54650) (patentee)  
U.S. Patent 3,602,194 (August 31, 1971)

Intensive and efficient fish culture, for both sport and commercial purposes, usually requires, first, destruction of all the fish in the water body and then introduction of the desired species. The piscicides commonly used either take about 7 months to degrade to nontoxic concentrations, destroy organisms important as fish food, do not kill such ictulurides as catfish and bullheads, or are not completely effective in waters of high pH. Juglone (5-hydroxy-1,4-naphthoquinone), the chemical proposed here, is highly toxic to a wide variety of fish species. Its toxicity is not significantly altered by differing water hardness or temperature. At concentrations of between 50 and 500 p.p.b. (depending on the resistance of the target fish), it will kill fish within 24 hr., yet it degrades rapidly enough to allow restocking in from 10 to 60 days.

Juglone can be extracted from walnut husks by leaching with ether or other solvents, or it can be synthesized by oxidation of 1,5-dihydroxynaphthalene. The crude extract can be purified in a variety of conventional ways, including by sublimation. For treating ponds or lakes, juglone solution is dispensed from a boat; for flowing streams, it is metered into the water at a rate proportional to the flow of the stream. [4 tables] LB

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 2 PAGE 31

9.16

GEORGIA CATFISH PRODUCTION STUDY EVALUATES TECHNIQUE

Brown, Robert H.  
Feedstuffs 43, No. 43, 57 (October 16, 1971)

The profit margin in commercial catfish production is so slim that techniques to increase production must be found. At present, the catfish farmer can sell his harvest for 30-32¢ a pound; his rearing costs are 22-25¢ a pound, exclusive of costs for harvesting and hauling the fish to market. Because harvesting fish grown in raceways is less expensive (only two men are required) than harvesting those grown in ponds (ponds must be drained), and because oxygen content, feed, and disease can be controlled better in raceways than in cages, fisheries scientists and agricultural engineers at the University of Georgia's Coastal Plain Experiment Station at Tifton, Ga., are studying the economic possibilities of raceway-produced catfish.

The raceway system consists of eight 100-ft. sections built in tiers. Each section is 10 ft. wide at the bottom and 20 ft. wide at the top (since the sides have a 2:1 slope). The water is 2.5 ft. deep at the upper end and, because of the 1.5% slope on the bottom, 4 ft. deep at the lower end. Water for the system is drawn from a 500-ft. well, stored in a pond, and then pumped into a riser tower encircled by three baffles, each having about 1,900 3/8-in. holes. When water comes out of the well, it has virtually no oxygen, but by the time it passes through the pond and over the riser tower, the oxygen level is about 8 p.p.m., ample for support of the 19,200 fingerlings initially stocked in the system. As a supplement to the riser tower, aerators made of corrugated, translucent fiberglass panels punched with holes are installed on the dams between the sections. [3 figures] LB

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 2 PAGE 31

9.19  
(9.13)

DDT: DISRUPTED OSMOREGULATORY EVENTS IN THE INTESTINE OF THE EEL ANGUILLA ROSTRATA ADAPTED TO SEAWATER

Janicki, Ralph H. (Mount Desert Island Biological Laboratory, Salisbury Cove, Maine 04672), and William B. Kinter (Department of Physiology, State University of New York Upstate Medical Center, Syracuse, N.Y. 13210)  
Science 173, No. 4002, 1146-1148 (September 17, 1971)

Several investigators have reported that fish are the most sensitive of all vertebrates to such organochlorine pollutants as DDT. Using eels caught in Maine estuaries and adapted to sea water for 3 weeks, the present authors investigated the possibility that this extreme sensitivity might be reflected in parallel disruptions of osmoregulation and nerve function.

Marine teleosts preserve tissue hypotonicity by drinking sea water and absorbing sodium and chloride across the intestinal epithelium. Water, which follows the absorption of these ions, is retained in the body, whereas the ions are secreted by the gill epithelium. Apparently adenosine triphosphatases (ATPases) are a function of this osmoregulatory process. Water absorption by isolated sacs of eel intestine incubated in  $1.4 \times 10^{-4}$  M DDT (50 p.p.m.) was inhibited 47% (p < .01). In addition, the DDT strongly inhibited the (Na<sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>) ATPase; even at 5 p.p.m. DDT, inhibition was 43%; the concentration that inhibited 50% of the enzymatic activity was about 15 p.p.m. DDT also inhibited the Mg<sup>2+</sup> ATPase in intestinal homogenates of the eel, although to a lesser extent. The authors conclude that the extreme sensitivity of teleosts to organochlorine pollutants involves impairment of osmotic regulation by the pollutant. [2 figures, 30 references] LB

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 2 PAGE 31

THE ECONOMIST'S APPROACH TO POLLUTION AND ITS CONTROL

Solow, Robert M. (Economics Department, Massachusetts Institute of Technology, Cambridge, Mass.)  
Science 173, No. 3996, 498-503 (August 6, 1971)

Solution of the air-pollution/water-pollution problem actually involves the optimum social solution of the materials-disposal problem. Planning for this solution must take into account all the media of waste disposal (so that one form of waste is not simply changed to another, presumably less unpleasant, form) and it must be at least regional (so that environmental damage is not simply transferred to another geographical area). The only real solution is the recycling of materials. Charging polluters an amount directly proportional to their emission of pollutants is preferable to either regulation or subsidies as a device for environmental planning, since (1) an effluent tax concentrates automatically on the cheap abatement of pollution rather than on any artificial allocation of the abatement burden; (2) it gives polluters an incentive to look for new and cheaper methods of treating and reducing waste; (3) it allows for a certain amount of decentralized decision making; (4) it is more equitable than a subsidy and easier to administer than direct regulation; and (5) the construction of a good schedule of taxes or fees on effluent requires less information than does the construction of good regulations.

The whole problem of controlling pollution in modern society boils down to managing the material residuals of production. E. S. Mills' proposal (in preparation) that the government collect a materials-use fee on materials removed from the environment is described. Briefly, the original producer or importer of a raw (over)

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## NOTES ON EXPERIMENTAL REARING OF SWAMP EEL

9.16

Liu, Chia-kang (Chupe Fish Culture Station, Taiwan Fisheries Research Institute) Chinese-American Joint Commission on Rural Reconstruction Fisheries Series No. 11, 115-116 (May 1971) (Taipei, Taiwan, Republic of China)

Because the swamp eel (*Fluta alba* (Zuiew)), which is valued by the Chinese as food, has never been cultured, the author attempted to determine (1) whether it could be grown artificially, (2) what its feed-conversion ratio would be, and (3) whether it could be induced to feed during the day rather than at night, when it normally feeds. Using three concrete tanks 1 sq. m. in area, he grew the eels for 1 year in waters of varying temperatures and on various diets.

The experiments showed that swamp eels can be grown artificially. They can also be trained to feed during day; however, the feed-conversion ratio was very high, ranging from 19.5:1 to 25:1. To bring the ratio in line with more practicality, the amount of feed given should be from 3 to 5% of body weight. When the water temperature in the tank is lowered from about 26° C. to 16° C., feeding activity slows down; when it is lowered from about 26° C. to 16° C., activity stops completely. [table 1]

Forest-Montardo, Paula (Stn. Mar. Endoume, Marseilles, France)  
Chemical Abstracts 75, No. 11, 73134e (September 13, 1971)

# 9.19 EFFECT OF THE BASE COMPONENTS OF DETERGENTS FROM THE PETROCHEMICAL INDUSTRY ON SOME MARINE BENTHIC INVERTEBRATES

## (SISCERAL GRANULOMA IN BROOK TROUT)

51.6

Dunbar, Clarence E. Z. E. Bureau of Sport Fisheries and Wildlife, Eastern Fish Disease Laboratory, Kearneysville, W. Va. 25430, and Roger Lee Herman  
Journal of Nutrition 101, No. 1, 154-157 (November 1961)

Visceral granuloma is a chronic inflammatory disease that affects, primarily, the anterior stomach and posterior kidney of the brook trout. It appears to be a disease of cultured trout. In these experiments, the researchers fed brook trout a synthetic diet with suspect test diet components added and (2) a meat-meal diet with individual diet components removed to determine their effect on the incidence of visceral granuloma. Deletion of cottonseed meal from a granuloma-producing diet resulted in a very low incidence of the disease; addition of cottonseed meal to a nongranuloma-producing diet resulted in a relatively high incidence of the disease. However, because a low incidence of the disease did occur in the absence of cottonseed meal, the meal cannot be considered as the sole factor in the cause of the disease. Apparently gossypol was not the causative agent.

The authors concluded that visceral granuloma of the brook trout diet-associated but the exact cause is not yet known. They suspect that the disease is inflammatory response to some chemical irritant present in the diet components. [table 4, figures 4]

Taylor, Angela, E. R. [sic], and R. Muller (Blackwell: Oxford, England)  
Chemical Abstracts 75, No. 5, 31893w (August 2, 1971)

# 9.15 (SYMPOSIUM OF THE BRITISH SOCIETY FOR PARASITOLOGY, VOL. 8) ASPECTS OF FISH PARASITOLOGY

material would have to pay a fee based on the social cost to the environment if the material were returned to the environment in the most harmful way possible. Some or all of the fee could be refunded if the (certified) method of disposal warranted. The author suggests that whether or not this proposal is practical, it is of great merit, for the problem is put in the right setting (that is, in the global materials balance) and is characterized properly (on a price system with a centralized correction for the divergence between private and social costs).

[5 references]

FTF [9 references]

The author states that we do not face problems of increasing pollution because of advances in technology, but rather the hope of overcoming pollution rests on technological advance, and few areas exist where the amount of pollution per unit of production or consumption is not declining. He concludes from his analysis that pollution has become a matter of commanding emergency because of the rise in the scale of the national output. (The extent of our pollution in the United States is more understandable when we reflect that 10 minutes' consumption of fossil fuels in the United States today is equivalent to the cumulative total consumed by all mankind until the beginning of the 16th century--a period comprising tens of thousands of years of human life on earth.)

Van Tassel, Alfred J. (School of Business, Hofstra University, Hempstead, N.Y.)  
Technological Forecasting and Social Change 2, Nos. 3/4, 237-245 (1971)

# 9.19 A SEMINAR EXERCISE IN FORECASTING ECOLOGICAL CHANGES: POLLUTION FROM RISING INDUSTRIAL OUTPUT

PCB'S: LEAKS OF TOXIC SUBSTANCES RAISES ISSUE OF EFFECTS, REGULATION

Pichirallo, Joe  
Science 173, No. 4007, 899-906 (September 3, 1971)

Polychlorinated biphenyls (PCB's) are produced in the United States solely as a heat transfer mechanism and an insulating fluid, particularly for use in cooling systems and big power transformers. Because of their persistence as a chemical (they can withstand temperatures of up to 870° C. and are insoluble in water), they are very valuable to industry. But the same characteristics that make them safe for industry--for example, they reduce the chances of accidental explosions in big power transformers--makes them hazardous for a throw-away society--in the course of time, the product to which they have been added becomes waste, is thrown away, and the PCB's enter the environment, eventually making their way to the sea through drainage systems, spillages, and runoff till they are incorporated into the food chains.

The three principle ways they can contaminate food are from accidental leaks in industrial equipment; through the weathering or friction wearing of the many materials that have PCB's as an ingredient (the PCB's remaining intact even as a waste product), and through the interaction with food products of PCB ingredients in such substances as paint and plastic. The precise effect of these compounds on man has not been defined. The FDA has set 5 p.p.m. as the safe limit for human consumers. But tests have shown that 1 p.p.m. will kill half the shrimp in an experimental population--that 100 p.p.m. will have no adverse effect on rats. Such conflicting evidence, coupled with the lack of federal laws, the overlapping jurisdiction of federal enforcement and inspection agencies, and the proprietary secrecy shrouding the manufacturer's production and sales figures make regulation haphazard at best.

LB



Kalnina, Z. (Hydrobiology Laboratory, Institute of Biology of Academy of Science, Latvian S.S.R., 10 Meistaru Street, Riga, U.S.S.R.), and G. Polikarpov (Radiobiology Department, Institute of Biology of South Seas of Academy of Science, Ukrainian S.S.R., 2 Nahimov Street, Sevastopol, U.S.S.R.)  
Science **164**, No. 3887, 1517-1519 (June 27, 1969)

One of the hydrobiological problems resulting from the use of atomic energy involves the role of living and inert lake components in the cycling of strontium-90. Concentration factors (CF)--that is, the ratio of a radionuclide in a lake component to that in water--of strontium-90 for plankton, macrophytes, and substrates in a eutrophic, a mesotrophic-eutrophic, and a dystrophic lake were determined. The  $^{90}\text{Sr}$  CFs for both hydrobiota and substrates were higher in the dystrophic lake than in the other two lakes. CFs for plankton of eutrophic and mesotrophic-eutrophic lakes were similar. On a wet-weight basis, CFs for water plants were from three to seven times higher in autumn than in spring. Among lake substrates, sand had the lowest CFs, peat from the dystrophic lake the highest. CFs for ashed plankton in the eutrophic lake were significantly higher than those for ashed lake silt; however, CFs for ashed plankton and peat in the dystrophic lake were approximately equal.  
[4 tables, 12 references]

LB

Burnett, Robin (Hopkins Marine Station, Pacific Grove, Calif. 93950)  
Science **174**, No. 4009, 606-608 (November 5, 1971)

Marine organisms from the waters off southern California consistently contain higher concentrations of DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane], DDD [1,1-dichloro-2,2-bis(p-chlorophenyl)ethane], and DDE [1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene] than do those marine organisms taken from near Monterey Bay and San Francisco Bay, even though these two bay areas receive drainage from extensive agricultural areas. This situation has been attributed to a generally southerly drift of DDT-laden aerial particles, coupled with an input from sewer systems. In the present article, the author reports on a determination of the relative importance of the various inputs of tDDT--i.e., total DDT, DDD, and DDE--into California coastal waters and provides a profile of the extent of tDDT contamination along the coast of California. The common surf-zone sand crab *Emerita analoga* was selected as the indicator organism because it is a widely distributed particulate filter feeder and its individual range is at most a few kilometers. Samples of the sand crab were taken from 19 California beaches ranging from 37°48' N. to 31°50' N. latitude.

The total concentrations in the sand crab from the beaches reflected the tDDT contamination nearby. The sand crabs near the Los Angeles County sewer outfall contained more than 45 times as much tDDT as did the animals near major agricultural drainage areas. The author estimated that the sediments near the outfall probably contain over 100 metric tons of tDDT--a reservoir for input into marine organisms. [1 figure, 1 table, 17 references]

FTP

Korringa, P. (Rijksinstituut voor Visserijonderzoek, IJmuiden, Netherlands)  
Interocean **70** 1, 119-123 (1970) (VDI-Verlag G.m.b.H., Düsseldorf, Germany)

UNESCO's Intergovernmental Oceanographic Commission, of which the author was chairman, has defined marine pollution as "introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairing the quality for use of sea water and reduction of amenities." This definition is used here accepted.

That marine pollution exists and that concern for the situation is worldwide is unquestioned. But that the press, well-known personalities, and chauvinistic organizations have been guilty of disseminating irresponsible misconceptions about its nature and extent is also demonstrable. Postures arrived at through emotion are not conducive to a reasoned consideration of the measures that should be taken to control the pollution. Before agreement can be reached in framing a convention to control pollution of the sea, goals should be clarified--that is, a discussion of the philosophy of how much control is needed should precede a stipulation of the legal and technical ways and means of achieving that control.

The philosophies of control vary in the extreme. (1) At one extreme is the view, held by nature protectionists, that nobody has the right to bring anything into the marine environment that does not naturally belong there. Man's technological achievements have no place in this picture. (2) Somewhat less extreme is the view that no substance or energy that may harm elements of the sea's flora or (over)

Marcy, Barton C., Jr. (Essex Marine Laboratory, Essex, Conn. 06426)  
Journal of the Fisheries Research Board of Canada **28**, No. 7, 1057-1060 (July 1971)

The electricity-generating plant located 17 mi. upriver from the mouth of the Connecticut River draws cooling water from the river, passes it through the plant's heat-exchange system, and discharges the heated water over a weir into a canal, whence it is returned to the river. The canal is 60 ft. wide, 10 ft. deep, and slightly over a mile long. When the water is first discharged into the canal, its temperature is about 12.5° C. above that of the ambient water; by the time it reaches the lower end of the canal, its temperature has dropped about 1° C. Due to the velocity of the water flow, nonscreenable organisms that are entrained in the condenser cooling-water system are exposed to an elevated temperature for more 50 to 100 min.

The author measured the survival rate of nine species of fish larvae (<15 mm.) collected below the outfall weir and at three locations along the discharge canal. When water temperatures in the canal were above 30° C. (95% of the time), no young fish or larvae lived to reach the end of the canal. During July and August, when water temperatures were above 35° C., none survived passage through the plant. Since most of the fish collected were less than 15 mm. long, the author considers it impossible to screen these organisms out without impairing plant operation. Kert reported in 1953 that impingement of striped bass eggs and larvae on fine mesh screening for even a short time was fatal.

[1 figure, 2 tables, 6 references]

LB



<p>9.19</p> <p>HANDBOOK OF TOXICITY OF PESTICIDES TO WILDLIFE</p> <p>Tucker, Richard K., and D. Glen Crabtree (Denver Wildlife Research Center, Bureau of Sport Fisheries and Wildlife, Denver, Colo.)</p> <p>Report BSWF-RP-84, 135 pp. (June 1970) (Revision of report dated March 1970). Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. PB-198 815, PC\$3.00, microfiche 954.</p> <p>Government Reports Announcements <u>71</u>, No. 12, 60 (June 25, 1971)</p> <p>This handbook was written to fill a long-standing need for a compendium of pesticide toxicity data for wildlife species that will provide, if not final answers, at least a basis for comparison of one pesticide with another. The chemicals chosen for testing include 108 pesticides used in thousands of formulations. Generally they are the pesticides to which wildlife are either most often exposed or most susceptible. Toxicity studies were conducted upon 30 common wildlife species such as mallard ducks, ring-necked pheasants, house sparrows, bobwhite quail, common bullfrogs, and mule deer. Toxicity information is given separately for each pesticide. The chemicals appear alphabetically and are cross-indexed by common, trade, and chemical names. The acute oral toxicity values given include information on species, sex, age, symptoms and additional information on subacute and reproductive tests for many of the pesticides.</p> <p>Reprinted (abstract) (C.M.W.)</p> <p>Chemical Abstracts <u>73</u>, No. 23, 119589w (December 7, 1970)</p>	<p>9.19</p> <p>THERMAL TOLERANCE OF JUVENILE PACIFIC SALMON AND STEELHEAD TROUT IN RELATION TO SUPERSATURATION OF NITROGEN GAS</p> <p>Ebel, Wesley J., Earl M. Dawley, and Bruce H. Monk (National Marine Fisheries Service, Biological Laboratory, Seattle, Wash. 98102)</p> <p>Fishery Bulletin <u>69</u>, No. 4, 833-843 (October 1971)</p> <p>Thermal tolerance of juvenile chinook salmon (<i>Oncorhynchus tshawytscha</i>), coho salmon (<i>O. kisutch</i>), and steelhead trout (<i>Salmo gairdneri</i>) that had been held at various acclimation temperatures was lowered when test water was supersaturated (125-130% of saturation) with nitrogen gas. Increasing the depth of the test tank allowed the fish to compensate somewhat for the supersaturation by sounding, but substantial mortalities still occurred. A comparison of tolerance among the species tested revealed that coho salmon were the most tolerant, chinook salmon next, and steelhead trout the least tolerant to temperature increases in the presence of supersaturation of nitrogen.</p> <p>Authors' abstract [6 figures, 10 tables, 11 references]</p> <p>The measurements which must be made in order to monitor the quality of water discharged by an industrial plant and the equipment which is available to manufacturers for this purpose are described. C.C.N.</p> <p>Reprinted</p> <p>BFMIRA Abstracts <u>24</u>, No. 4, Abstract No. 1154, 249 (April 1971)</p>
<p>9.19</p> <p>RESIDUES OF DDT AND ITS METABOLITES IN TISSUES OF ADRIATIC CLOPEITFORMS</p> <p>Viviani, Romano, Anna R. Borgatti, D. Cancellieri, Giorgio Crisetti, and P. Cortesi (Fac. Med. Vet., Univ. Bologna, Bologna, Italy)</p> <p>Chemical Abstracts <u>73</u>, No. 23, 119589w (December 7, 1970)</p> <p>Reprinted</p> <p>DDT MAY BE GOOD FOR PEOPLE</p> <p>Anonymous</p> <p>Nature <u>233</u>, No. 5320, 437-438 (October 15, 1971)</p> <p>The Mrak Commission reported in December 1969, and the U.S. Environmental Protection Agency's DDT Advisory Committee confirmed in September 1971, that DDT has a very low acute toxicity to man and domestic animals; even high doses for short times do not seem to cause irreversible damage. The harm that it does to other species, then, is the only valid reason for the fearsome image it has been given of late. Since it is destined to play a very important part in helping to make sure that food production in the future will rise more quickly than the population grows, the dangers it and other pesticides pose must be put in some kind of perspective.</p> <p>The case for better methods of regulating the use of pesticides is strong. Often they have been misused--excessive doses have killed off animals as well as insects; sometimes the predator rather than the pest has been killed by misdirected application; and always there is the chance that the pesticide can be concentrated at the top of the food chain and impose severe strain on a species totally unrelated to the target pest. Often the "facts" ascribed to their use have been misleading--less careful workers have misinterpreted chromatographic peaks; both the mechanics of the distribution of DDT, the mechanism by which it is accumulated in human tissue, and the damage it is likely to do to human beings have been inadequately explored. Professional scientists can help by insisting that the present wave of discussion be conducted with a better sense of proportion than it has been done in the past.</p> <p>LB</p>	<p>9.19</p> <p>DETECTION AND QUANTITATION OF POLLUTANTS</p> <p>King, G. H.</p> <p>Pollution in the Seventies. Suppl. Maint. Engng Industr. Process Heat., pp. 28-29 (November 1970)</p> <p>BFMIRA Abstracts <u>24</u>, No. 4, Abstract No. 1154, 249 (April 1971)</p> <p>(The) fauna should ever be discharged, directly or indirectly, into the sea. (The author refutes the two mainstays of this philosophy--the prerequisites for productivity and the loss of genetic material.) (3) More realistic is the view that marine pollution should be controlled in such a way that no damage is done to the natural resources that man himself is interested in, to either the presently exploited or the potentially exploitable resources. (4) Another view is held by people who are concerned primarily with protection of the amenities. They give high priority to drastic measures for maintaining or rehabilitating the esthetic aspects of water and beaches. This group of nature protectionists, who are interested in clean, transparent water devoid of living organisms, should be distinguished from those who wish to maintain the status quo at any cost, and from those who are interested in high productivity, increased fertility, and thus a reduced number of species. (5) At the extreme opposite to (1) is the view that surrender of a large part of sea life is much more practical than perfected destruction of all the waste of an industrialized world. Man lives on land; he draws an extremely small part of his sustenance from the sea; thus control of land, air, lake, and river pollution should prepose control of marine pollution.</p> <p>Once the type of philosophy is agreed upon, regional regulations as precursors of a worldwide convention might be framed--just to avoid undue delay. However, in the final analysis, a convention will be effective only when a good system of international control becomes operative, for different sets of prescriptions in different countries can only lead to false and destructive competition. Meanwhile, each country should survey the amount of waste products it brings directly or indirectly to the sea and classify these products according to their potential danger to the marine environment.</p> <p>The potential or real danger, or lack of it, of various types of pollution is discussed, and the reasons for never dumping persistent pollutants in the sea (even when they are packed in drums or concrete containers) are given.</p> <p>LB</p>



REPORT OF THE SEMINAR ON METHODS OF DETECTION, MEASUREMENT  
AND MONITORING OF POLLUTANTS IN THE MARINE ENVIRONMENT

Tomezak, G. (Marine Biology and Environment Branch, Fishery Resources Division, Department of Fisheries, FAO, Rome, Italy), and E. D. Goldberg (Scripps Institution of Oceanography, P.O. Box 109, La Jolla, Calif. 92037) (editors)  
FAO Fisheries Reports, No. 99 Supplement 1, iii + 123 pp. (August 1971)

The subject seminar, which was held in Rome, December 4-10, 1970, was divided into nine panels:

- Halogenated Hydrocarbons [27 references]
- Petroleum [4 figures, 1 table, 71 references]
- Inorganic Chemicals [2 tables, 52 references]
- Organic Chemicals [3 figures, 3 tables, 26 references]
- Nutrient Chemicals [3 tables, 44 references]
- Suspended Solids and Turbidity [1 figure, 22 references]
- Radioactivity [1 figure, 4 tables, 36 references]
- Monitoring Organisms [1 table, 66 references]
- Design of World Monitoring System [14 references]

The combined results of the deliberations held by the panelists are intended to provide direction for the training of technical personnel and management involved in marine pollution problems. Plans are to publish an expanded edition of this report. It will be titled "A Guide to Marine Pollution," and will be published by Gordon and Breach, Science Publishers, Inc., 150 Fifth Ave., New York, N.Y. 10011.

LB

## MARINE POLLUTION SYMPOSIUM

Natural Resources Journal 11, No. 2, 221-389 (April 1971)

The articles of this Marine Pollution Symposium consist of:

- "International Law and Marine Pollution: Radioactive Waste and 'Other Hazardous Substances,'" by E. D. Brown (Woodrow Wilson International Center for Scholars, Washington, D.C.), pp. 221-255. [31 footnotes]
- "Control of Estuarine Pollution," by Jerome B. Gilbert (State Water Resources Control Board, California) and Ronald B. Robie (University of the Pacific, Stockton, Calif.), pp. 256-273. [103 footnotes]
- "Amenities Rights -- Parallels to Pollution Taxes," by L. F. E. Goldie (Naval War College, Newport, R.I.), pp. 274-280. [17 footnotes]
- "Radioactive Waste and the Environment," by Harold P. Green (National Law Center, George Washington University, Washington, D.C.), pp. 281-295. [52 footnotes]
- "International Control of Marine Pollution," by Michael Hardy (Office of Legal Affairs, United Nations), pp. 296-348. [152 footnotes]
- "The Externalities of a Torrey Canyon Situation; An Impetus for Change in Legislation," by Henry J. McGurran (McGarty & Noone, Washington, D.C.), pp. 349-372. [70 footnotes]
- "The Economics of Sewage Disposal in a Coastal Urban Area -- A Case Study of the Monterey Peninsula, California," by Gail Eric Updegraff (Agricultural Economics, Michigan State University, Lansing, Mich.), pp. 373-389. [33 footnotes]

LTP

## PUBLIC PERCEPTIONS OF WATER QUALITY

David, Elizabeth L. (Department of Agricultural Economics, University of Wisconsin, Madison, Wis. 53706)

Water Resources Research 7, No. 3, 453-457 (June 1971)

Water pollution is perceived by the general public to be of increasing concern as a major problem facing the state. From a survey of a representative sample of adults in Wisconsin, it was shown that the public has rather definite ideas about what constitutes a description of pollution. The respondents mentioned algae and murky, dark water but did not often mention attributes such as chemicals or disease germs that are not detected by the human sensory system. When the respondents were asked to name water in the state that they felt was polluted, they named waters that in fact have the characteristics they described when defining pollution. The most widely used indicators of water pollution seem insufficient in light of the public definition of, and concern about, water pollution.

[1 table, 2 references]

Author's abstract

Government Research Announcements 71, No. 18, 54 (September 25, 1971)

Fromm, Paul O. (Dept. of Physiology, Michigan State Univ., East Lansing, Mich.)

Report W71-10639, EPA-WQO-18050-DST-12/70, 59 pp. (December 1970). Paper copy available from the U.S. Government Printing Office, Washington, D.C. 20402;

Order No. EPA 18050 DST 12/70, \$0.65.

TOXIC ACTION OF WATER SOLUBLE POLLUTANTS ON FRESHWATER FISH

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 35

9.19

REPORT OF THE THIRD SESSION OF THE IMCO/FAO/UNESCO/WMO/WHO/  
IAEA/UN JOINT GROUP OF EXPERTS ON THE SCIENTIFIC ASPECTS  
OF MARINE POLLUTION (GESAMP)

Anonymous

FAO Fisheries Reports No. 102, iv + 85 pp. (June 1971)

During the subject session, which was held in Rome, February 22-27, 1971, the following subjects were considered: pollution of the sea through the atmosphere; dispersion and movement of pollutants in the sea by natural physical processes; harmful chemical substances (a revised review); noxious and hazardous cargoes that may cause serious marine pollution (identification of); the marine pollution problems in relation to the long-term and expanded program of oceanic exploration and research; the scientific basis for a monitoring system for marine pollution, including registration of deliberate or accidental discharges into the marine environment; microbiological and toxicological aspects of marine pollution with particular reference to public health; an information service (storage, retrieval, and exchange) concerning marine pollution and its effects.

[5 tables, 1 diagram]

LB

Chemical Abstracts 74, No. 15, 75583d (April 12, 1971)

Anders, Raymond E., and Alfred J. Wilson, Jr. (Mar. Mammal Biol. Lab., Natl. Mar. Fish. Serv., Seattle, Wash.)

## ORGANOCHLORINE PESTICIDES IN NURSING FUR SEAL PUPS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 2 PAGE 35

9.19



## THE TOXICITY OF 2, 2'-D AND PICLORAM HERBICIDES TO FISH

61'6

REVIEW PAPER: MEASUREMENT OF POLLUTANT TOXICITY TO FISH --  
III. SUBLETHAL EFFECTS AND "SAFE" CONCENTRATIONS

Sargent, M., D. Blazek, J. H. Elder, C. A. A. Lembi, and D. J. Morre (Joint Highway Research Project, Purdue Univ., Lafayette, Ind.)  
Technical Paper JHRP-24, 25 pp. (October 1970) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. PB 101-2096; PC\$3.00; MF\$0.95.

Government Research Announcements 17, No. 17, 19 (September 10, 1971)

Two common herbicides, picloram or Tordon (2,4-dichlorophenoxyacetic acid) and 2,4'-D (2,4-dichlorophenoxyacetic acid) exhibit low toxicity to fish.

Authors' abstract in part

The workers made an assessment of the radioactive contamination of 14 species of fish, 4 species of shellfish, and 5 species of seaweeds harvested in the sea adjacent to Korea during 1968. The level of radioactive accumulation of the materials was far below the maximum level specified by the International Commission on Radiological Protection. [3 figures, 4 tables, 12 references]

Extractor: FTP

Chang, Dong Suck, and Jeong Nam Jun  
Bull. Fish. Res. Dev. Agency 5, 7-15 (1970)  
Korean Scientific Abstracts 3, No. 4, Abstract No. 71/412, 117-118 (21-22) (August 1971)

9.19 A STUDY ON THE RADIOACTIVE CONTAMINATION OF MARINE PRODUCTS

SEAS WINDS TRADE EAST-EAST AND NORTH-EAST IN THE ATLANTIC OCEAN (11'6)

Chester, R. R. (Department of Oceanography, The University, Liverpool L69 3BX, Eng-land) and J. J. Griffin (Scripps Institution of Oceanography, La Jolla, Calif. 92036) (1976)

Several reports over the past decade have emphasized the effect of dust on the atmosphere on the processes of deep-sea sedimentation and on certain aspects of marine pollution. The importance of wind transport for the distribution of dust over the oceans varies by area, the northeast trade wind system over the North Atlantic reportedly carrying the highest content of dust. The author reports here the concentrations and kinds (the color, the particle size, and the mineralogy) of atmospheric dust introduced by the southeast and northeast trades into the Atlantic Ocean about 23° N. S. and 23° N. S. [3 references]

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Chemical Abstracts 74, No. 23, 122039c (June 7, 1971)

9.19 EFFECT OF ELEMENTARY PHOSPHORUS ON FISH  
(9.13) (PATHOPHYSIOLOGICAL STUDIES)

Krasnov, S. K. (Gos. Nauchno-Issled. Inst. Ozer. Rechn. Rybn. Khoz., Saratov, U.S.S.R.)

9.19

EFFECT OF SOME PHOSPHORUS HALIDES ON FISH DURING ONTOGENESIS

(9.13)

Gurova, G. V., S. K. Krasnov, and N. D. Mazmanidi (Gos. Nauchno-Issled. Inst. Ozer. Rechn. Rybn. Khoz., Saratov, U.S.S.R.)

Chemical Abstracts 74, No. 23, 122051r (June 7, 1971)

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[2 tables, 7 references]

Although several industrial sources are demonstrably responsible for mercury pollution in ocean-going fish, they are not the only sources of the mercury in the environment. The physical properties of mercury, the manufacture of mercury by the smelting of cinnabar, the conversion by certain microorganisms of mercury to dimethyl mercury, and volcanism should all be considered. The authors report that significant amounts of mercury are produced by active volcanism in Hawaii. The magnitude of the mercury content of the hot gases and vapors discharged more or less continuously through cracks and crevices in Hawaii Volcanoes National Park agrees well with that reported by White et al. (1970) for thermal areas in Kamohakaha and the Kure Islands. [2 tables, 7 references]

61'6 SI IS OF POLLUTION? SOURCE A NATURAL VOLCANOES HAWAIIAN FROM MERCURY

9.19 POLLUTION OF THE SEAS  
(1.0146)

Cole, H. A.  
Chem. Britain 7, No. 6, 232-235 (1971)  
BEMIRA Abstracts 24, No. 9, Abstract No. 3029, 621 (September 1971)

The contamination of the UK's fish and shellfish resources by metals and chlorinated hydrocarbons is discussed. D.B. Reprinted

[137 references]

Although this review is research oriented, the author states that he intends it to relate to practical needs in pollution-control work. Part I of the review, "Bioassay Methods for Acute Toxicity" (Water Res. 3, 793-821 (1969)), reviewed advantageous methods of performing lethality tests. Part II, "Utilizing and Applying Bioassay Results" (ibid. 4, 3-32 (1970)), discussed ways of using the information derived from these tests, its application to field problems, and its use in unraveling the effects of other environmental conditions, for example. This Part III reviews ways of measuring sublethal toxicity and how these measurements can be used in antipollution efforts, and it describes various methods of estimating the "safe" concentration of a pollutant as some fraction of the lethal concentrations.

Sprague, J. B. (Department of Zoology, University of Guelph, Guelph, Ont., Canada) Water Research 5, No. 6, 245-266 (June 1971) (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, England)

REVIEW PAPER: MEASUREMENT OF POLLUTANT TOXICITY TO FISH --  
III. SUBLETHAL EFFECTS AND "SAFE" CONCENTRATIONS



9.19  
(0.8)

DISPOSAL OF WASTES FROM SWINE FEEDING FLOORS  
TO MINIMIZE STREAM POLLUTION

Schwiesow, William F., Herbert L. Brodie, and Harry J. Eby (Dept. of Agricultural Engineering, Maryland Univ., College Park, Md.)  
Completion Report W71-05738, OMRR-A-004-MD(1), 16 pp. (January 1970). Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. PB-198 028, PC\$3.00, microfiche 954.  
Government Reports Announcements 71, No. 10, 107 (May 25, 1971)

The research was to investigate the feasibility of a septic disposal system with an underground distribution system as a means of eliminating runoff from swine feeding floors into the surface waters. Installation provided for hydraulic cleaning of the feeding floor. Manure, water and uneaten feed was washed into gutters, one on each side of the house. It was soon evident that the large tank intended to serve as a septic tank was inadequate and performed primarily as a sedimentation tank. Data taken showed this tank was satisfactory for accumulating solid wastes for a period of about 5 weeks. Solids were removed by mechanical means. Tests on the tile distribution system showed that the capacity to dispose of the liquid effluent was more than needed. Proper operation should provide a satisfactory means of disposing of the liquid portion of the wastes without polluting the nearby river. (Author)  
Reprinted

9.19  
(0.6)

PESTICIDES AROUND US

Edwards, Clive A. (reviewer)  
Pesticides in the Environment  
Robert H. White-Stevens (New Jersey Bureau of Conservation and Environmental Science) (editor)  
Published by Marcel Dekker, New York, xv + 270 pp. (June 1971) \$23.50  
Nature 233, No. 5314, 72 (September 3, 1971)

This book is the first of five that will be combined into a two-volume set. The first volume will deal with the theoretical aspects of pesticidal chemicals; the second, with the practical problems of handling pesticides in the environment. The purpose of both, as set forth by the editor, are (1) to present the properties, functions, utility, and contributions of pesticidal chemicals to human welfare and (2) to provide data that will enable attainment of the optimum combination of efficacy, safety, reliability, economy, and environmental improvement.

This first part has three sections: a discussion of the chemistry and biology of pesticides, by R. L. Metcalf; the metabolism of insecticides and fungicides, by T. R. Fukuto and J. J. Sims; and the metabolism of herbicides, by J. E. Loeffler and J. van Overbeek. Although the sections are well written and could serve as an excellent, chemically oriented, introductory text on pesticides, its value as a reference work is seriously handicapped by its lack of an index. LB

9.19  
(9.15)

HISTOPATHOLOGIC LESIONS IN CUTTHROAT TROUT (SALMO CLARKI)  
EXPOSED CHRONICALLY TO THE INSECTICIDE ENDRIN

Eller, Lafayette L. (Fish-Pesticide Research Laboratory, Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, Columbia, Mo. 65201)  
American Journal of Pathology 64, No. 2, 321-336 (August 1971)

Pathologic conditions appeared in the gills, liver, pancreas, brain, and ovary of cutthroat trout exposed to endrin by bath and in food. Edema, hemorrhage, and possibly intracapillary congestion marked the gill damage; hepatic lesions similar to those preceding development of hepatomas in nutritionally deficient fish appeared, and the increased incidence and severity of liver deterioration with increased levels of endrin (0.01 mg./l. endrin for 5 mo.) suggest a nutritional deficiency intensified by endrin. A marked hyperplasia of pancreatic islets and a marked reduction of ooplasm (causing the involution of the follicular layer of atypical, irregular oocytes) also appeared after the fish were exposed to high levels of endrin. [9 figures, 35 references] LB

Reprinted

It is reported that in a sample of 846 foodstuffs purchased in Vancouver, Toronto and Montreal, 76 contained more than 0.5 p.p.m. cadmium. Food contained: meat, fish, milk products, vegetables, tea, and spices. D.B.

Environment 13, No. 3, 23 (1971)  
BEMIRA Abstracts 24, No. 8, Abstract No. 2694, 554 (August 1971)

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TECHNOLOGICAL FORECASTING: THE DELPHI TECHNIQUE

Wooden, Robert P., and Bill R. Richeson (Pillsbury Co., R&D Lab., 311 2nd Street, S.E., Minneapolis, Minn. 55414)  
Food Technology 25, No. 10, 59-62 (October 1971)

More than one-half of the 500 largest U.S. corporations have formal long-range programs; and, most of these programs involve some degree of technological forecasting. Technological forecasting is defined as a probability assessment, on a relatively high confidence level, of future technology transfer. The purpose of technological forecasts is to help evaluate the probability and significance of various possible future technological developments so that managers can make better decisions. The requisites for technological forecasting are (1) a reliable data base, (2) judgment and common sense on the part of the forecaster, and (3) an understanding of the forecasting techniques. There are four basic types of technological forecasts:

1. Intuitive Forecast--prediction of the future through solicitation of opinion.
2. Trend Extrapolation--prediction of the future based on trends of the past.
3. Trend Correlation Analysis--prediction of the future by considering the interrelationship of two or more trends.
4. Analogy--prediction of the mode of an event in the future by analysis of its mode in the past.

The Delphi Technique, discussed in this article, is of the Intuitive Forecast type and is a sophisticated method for developing consensus (or a systematic solicitation of expert opinion).

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Kenward, Michael (editor)

New Scientist 47, No. 719, 581 (September 17, 1970)

#### Deep-Sea Mining

In December 1969, the United Nations General Assembly passed a resolution calling for an international ocean floor regime to ensure that the conditions under which states acquire rights to resources of the seabed would be observed in an orderly manner. During a conference of the International Law Association in The Hague on August 28, a draft declaration of principles was proposed. The declaration proposed that three international bodies be set up to govern the activities of states in the exploration and exploitation of mineral resources of the seabed and the subsoil beyond the limits of national jurisdiction. It specifies that the seabed and the subsoil beyond the Continental Shelf would not be subject to national appropriation by any means nor would any state exercise or claim sovereignty or sovereignty rights there. It rejects the idea that freedom of the seas should also apply to exploration and exploitation of minerals of the ocean floor. It also rejects the flag-state approach to control--that is, the approach in which the country whose vessels have already explored an area of the ocean floor is assumed to have control in that area.

The three bodies that would constitute the international ocean floor regime are: (1) an international registration agency, which would be purely administrative and would perform such functions as maintaining a register of mining claims and

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(9.19)

University of British Columbia Law Review 6, No. 1, 111-286 (June 1971)

The nine articles in this symposium are as follows:

- "Government and the Environment: A Need for Public Participation," by David Anderson (M.P., Esquimalt-Saanich, Canada), pp. 111-114.
- "International Law and Pollution of International Rivers and Lakes," by C. B. Bourne (University of British Columbia, Vancouver, British Columbia, Canada), pp. 115-136. [68 footnotes]
- "Oil Pollution Problems on the Pacific Coast," by James David Dunn (University of British Columbia), pp. 137-165. [115 footnotes]
- "Legal Techniques for Pollution Control: The Role of the Public," by Alastair R. Lucas (University of British Columbia), pp. 167-191. [126 footnotes]
- "Locus Standi and Environmental Control: A Policy for Comparison," by Howard R. Eddy, pp. 193-214. [118 footnotes]
- "Common Law Remedies and Protection of the Environment," by Julian Conrad Jurgensmeyer (Tulane University, New Orleans, La.), pp. 215-236. [68 footnotes]
- "Legal Problems in the Protection of Recreational Values," by Richard Robinson (University of British Columbia), pp. 237-259. [89 footnotes, 2 appendices]
- "Municipal Control of Air Pollution in British Columbia," by Eric C. E. Todd (University of British Columbia), pp. 261-270. [25 footnotes]
- "Anti-Pollution Legislation and Its Enforcement: Empirical Study," by Patrick Good (University of British Columbia), pp. 271-286. [19 footnotes]

FTP

Natural Resources Lawyer 4, No. 3, 569-697 (July 1971)

The following papers were presented at the Offshore Technology Conference in Houston, Texas, April 19-20, 1971. The remaining papers of this program on Legal Aspects of Seabed Petroleum and Resource Development will be printed in the November 1971 issue of the journal.

- "The United States Proposal for Legal Regulation of Seabed Mineral Exploitation Beyond National Jurisdiction," by John R. Stevenson (Department of State, Washington, D.C.), pp. 570-581.
- "National Security Interests in Ocean Space," by Leigh S. Ratiner (Department of Defense Advisory Group on Law of the Sea), pp. 582-596.
- "United States Seabed Minerals Policy," by Northcutt Ely (Washington, D.C.), pp. 597-621. [28 footnotes]
- "Current International Issues Relating to the Law of the Sea," by Paul Bamela Engo (Minister Counsellor of the Permanent Mission of Cameroon to the United Nations), pp. 622-628.
- "Some Unresolved Issues on the Law of the Sea," by J. A. Beesley (Department of External Affairs, Canada), pp. 629-638.
- "Problems of Legal Security of the World Hard Minerals Industry in the International Ocean," by Richard J. Greenwald (Special Council for Deepsea Ventures, Inc.), pp. 639-645.
- "The Future of Our Continental Shelf and the Seabeds," by Ted Stevens (United States Senate, Washington, D.C.), pp. 646-653.

(over)

Burke, William T. (Law School, University of Washington, Seattle, Washington)  
Natural Resources Lawyer 3, No. 2, 195-226 (May 1970)

Lawyers are now principally concerned with two questions dealing with the ocean and its resources: (1) the limit on coastal control and (2) jurisdiction over the seabed and subsoil. In this article, the author comments on recent recommendations on the issues of the Continental Shelf and the nature of the regulatory system for mineral exploitation beyond this limit, and to some of the consequences of attempting soon to convene an international conference to dispose of these issues by agreement. He discusses in particular: (1) recent developments in the decision process by which legal prescriptions are devised and projected to regulate the activities in the ocean, (2) possible consequences of quick action to convene a new law of the sea conference, and (3) some of the substantive recommendations proposed by the Presidents' Commission on Marine Science, Engineering, and Resources.

The substantive recommendations of the Commission were as follows: (1) Definition of the Continental Shelf fixing the limit at the 200-meter isobath or 50 nautical miles from the baseline, whichever includes the greater area. (2) Creation of an intermediate zone reaching out to the 2,500-meter isobath or 100 nautical miles from the baseline, whichever includes the greater area. Only the coastal state or its nationals would be permitted to exploit or explore in the intermediate zone, but the framework of regulation would otherwise be that which applies to the area beyond this zone. (3) Conclusion of an international agreement

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9.4 FISHERY RESEARCH CHAOS. NEED FOR  
(9.7) REAPPRAISAL OF SCIENTISTS' ROLE

Slack, E. B. (Applied Fisheries, Victoria University, Wellington, New Zealand)  
Commercial Fishing 2, No. 7, 27-29 (July 1970)

This article contains extracts taken from a paper the author presented to the Government and to the National Development Conference through the New Zealand Association of Scientists. The paper deals with the contribution of science and technology to fisheries development and outlines a course for getting the fishing industry on its feet.

Industrial fishing has three distinct sectors: (1) harvesting the resource, (2) processing and manufacturing it, and (3) distributing and marketing it. Research is needed in all three. But it should be integrated, coordinated research comprising the biology of the resource, the technology of its capture, the economics of operations, and the technology of processing; all these research problems should be explored simultaneously so that industry could be given a package of all the information it needs to begin exploitation of a given resource on a rational basis. The universities must play a major role in developing fishery resources. They must provide graduates trained to think out fisheries problems in a broad context--not just specialists who are narrowly interested in isolated fields. Since a fisheries program must involve a whole field of national enterprises that will show the greatest economic return for the effort spent, the experts who make the decisions relative to the contribution of each potential project to national fisheries development must be able to mesh a knowledge of (over)

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9.6 PROCEEDINGS OF THE 23RD ANNUAL SESSION OF THE GULF AND  
(1.0119) CARIBBEAN FISHERIES INSTITUTE  
(1.0117)

Higman, James B. (Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Fla. 33149) (editor)  
University of Miami Sea Grant Publication, 212 pp. (June 1971)

Card A

The 23rd session of the Institute was held in Willemstad, Curacao, November 9-12, 1970. It was organized into five major sessions, four or five papers being presented at each:

International Session

Fisheries and the IDOE [International Decade of Ocean Exploration], by J. L. McHugh (Marine Sciences Research Center, State University of New York, Stony Brook, N.Y. 11790) [10 references]

Soviet Fisheries and Fisheries Research Off the East Coast of the United States, by Albert C. Jensen (Division of Marine and Coastal Resources, New York State Department of Environmental Conservation, Ronkonkoma, N.Y. 11779) [7 figures, 2 tables, 17 references]

Informal Comments on Foreign Competition and the U.S. Fisheries, by Burdick H. Brittin (Department of State, Washington, D.C. 20520)

Report from Malta, by C. P. Idyll (Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Fla. 33149)

Mergers and Investment Session

Comments on Economic and Financial Aspects of the Gulf Fisheries, by Arthur H. Kantner (Federal Reserve Bank of Atlanta, New Orleans, La. 70160) (over)

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9.6 MONTEREY BAY BIBLIOGRAPHY  
(1.0114)

Baron, Doris (Moss Landing Marine Laboratories, P.O. Box 223, Moss Landing, Calif. 95039) (editor)  
Sea Grant Technical Publication 71-1, xvi + 284 pp. (1971) (Sea Grant Program, Moss Landing Marine Laboratories, Moss Landing, Calif. 95039)

The subtitle of this publication is "A Partial, Provisional Bibliography of Scientific and General Papers, Reports, Books, and Miscellaneous Publications which Deal Directly or Indirectly with the Central California Coast." Included are unpublished studies and data collections as well as published works. The main geographical area covered is the Central California Coast from Morro Bay to Tomales Bay, including the bordering land areas as well as the ocean and the bays.

The bibliography has four main sections: a table of contents, giving all the subject headings used, with cross reference notes when applicable; the citation list, including the library or libraries where the publication can be found; an author index, arranged alphabetically and including date of publication, citation number identifying the entry, and library where the publication is available; and a general index, listing topics alphabetically. Three appendices conclude the volume. The compilers of this bibliography of Monterey Bay, the focal point for widely diversified commercial and sports fishing industries, consider it the first step toward establishment of the organized information base required for effective development of a region that has such widely diversified use--commercial, residential, recreational, and educational.

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9.6 PROCEEDINGS OF THE 23RD ANNUAL SESSION OF THE GULF AND  
(1.0119) CARIBBEAN FISHERIES INSTITUTE  
(1.0117)

Card B

Advances in Pacific Shrimp Culture by Henry J. Schaffer (Monterrey Institute of Technology, Guaymas, Sonora, Mexico) [14 references]

The Distribution of Sediment Properties and Shrimp Catch on Two Shrimping Grounds on the Continental Shelf of the Gulf of Mexico, by John R. Grady (National Marine Fisheries Service Biological Laboratory, Galveston, Tex. 77550) [7 figures, 12 references]

Management Guidelines for Predicting Brown Shrimp, *Penaeus aztecus*. Production in Louisiana, by T. B. Ford and L. S. St. Amant (Louisiana Wild Life and Fisheries Commission, New Orleans, La. 70130) [13 figures, 3 references]

Caribbean Session

United Nations Development Program Food and Agriculture Organization of the United Nations Fishery Development Projects in the Caribbean, by Wm. Ellis Ripley (United Nations Development Program, New York, N.Y. 10017)

An Improved Field Method for Quality Evaluation of Shrimp Held in Refrigerated Brine and Ice, by Hugo Rojas Garcia (INDERENA-FAO, Technological Laboratory, Bogotá, Colombia) [2 figures, 4 references]

Status and Potential of the Fishery in the Caribbean, by Rolf Juhl (Fisheries Development Program, Department of Agriculture, Commonwealth of Puerto Rico, San Juan, P.R.) [2 tables, 12 references]

Dynamic Factors Affecting the Performance of the Antillean Fish Trap, by

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9.6 (1.0119)(1.0117)

Why Merge?, by Jacob Saliba (Katy Industries, Inc., Boston, Mass. 02199)  
Optimal Investment and Financial Strategies in Shrimp Fishing, by Robert R. Wilson, Russell G. Thompson, and Richard W. Callen (Institute of Statistics, Texas A&M University, College Station, Tex. 77840) [3 figures, 4 tables, 2 references]

Evaluating, Planning and Managing Risk Ventures, by C. M. Good (Lockwood-Greene Engineers, Inc., New York, N.Y. 10017) [2 tables]

Fishermen's Protective Fund, by Richard T. Whiteleather (National Marine Fisheries Service, U.S. Department of Commerce, St. Petersburg, Fla. 33701)

Management and Resources Utilization Session

A Food Technologist Looks at Fish Protein Concentrate, by Hovey M. Burgess (General Foods Corp. Technical Center, Tarrytown, N.Y. 10591) [1 table]

Fish Protein Concentrate: The Growth of an Industry, by George M. Knobl, Jr. (National Marine Fisheries Service, College Park, Md. 20740) [3 references]

Nightlighting -- A Harvesting Strategy for Underutilized Coastal Pelagic Schoolfishes, by Donald A. Wickham (National Marine Fisheries Service, Exploratory Fishing and Gear Research Base, Pascagoula, Miss. 39566) [79 references]

Results of Cooperative Investigations -- A Pilot Study of the Eastern Gulf of Mexico, by M. O. Winkler (State University of Florida, Institute of Oceanography, St. Petersburg, Fla. 33707) [10 charts, 2 tables, 5 references]

Shrimp Session

Some Economic Aspects of Pink Shrimp Farming in Florida, by Lee G. Anderson and Durbin C. Tabb (Department of Economics and Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Fla. 33149) [110 tables, 2 references]

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9.6 (1.0119)(1.0117)

J. L. Munro, P. H. Reeson, and V. C. Gaut (Port Royal Marine Laboratory. University of the West Indies, Kingston, Jamaica) [6 figures, 1 table, 4 references]

Refining Shrimp Culture Methods: The Effect of Temperature on Early Stages of the Commercial Pink Shrimp, by Anitra Thorhaug, Tom Devany, and Barbara Murphy (University of Miami, Miami, Fla. 33149) [6 figures, 15 references]

Porpoise Fisheries in the Southern Caribbean -- Present Utilizations and Future Potentials, by David K. Caldwell and Melba C. Caldwell (The Florida State Museum, University of Florida, Gainesville, Fla.) [7 figures, 33 references]

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PESTICIDE JOURNAL

9.6 (9.19)

Barnes, J. M. (reviewer)  
Pesticide Biochemistry and Physiology: An International Journal  
R. D. O'Brien (editor)  
Published by Academic Press, New York and London; Vol. 1, No. 1, 122 pp. (March 1971); \$30.00 per year.  
Nature 233, No. 5316, 214-215 (September 17, 1971)

Eisenberg, D., and W. Kauzmann  
The Structure and Properties of Water, xii + 296 pp. (Clarendon Press: Oxford; Oxford University Press: London, England [March 1969] Price 65s)  
Reviewed by K. E. Bett and A. Harlow  
Nature 222, No. 5615, 006 (May 31, 1969)

ANOMALOUS ABUNDANCE

9.6 (9.0)

It is generally agreed that the unusual behavior of water arises from structural and configurational effects resulting from the formation of hydrogen bonds between adjacent water molecules. Estimates concerning the degree of hydrogen bonding and the influence of temperature and pressure on the bonding, however, vary widely. This book summarizes most of the experimental and theoretical work that is relevant to clarifying the structure of water and reviews and assesses the progress that has been made toward a clarification. It includes a summary of the thermodynamic properties of steam and a discussion of these properties in terms of interactions between water molecules; a presentation of the structure of ice and its various polymorphs, along with an outline of their thermodynamic, electrical, and spectroscopic properties; a discussion of the role of hydrogen bonding in determining the structure of ice; and the most important half of the monograph that have been proposed to represent its structure.

which facilitates comparison of various measured or predicted properties, an appendix lists data published too late for incorporation in the main text; comprehensive author and subject indexes; and more than 100 references.

THE UNITED STATES DEPARTMENT OF COMMERCE: SERVING A GROWING ECONOMY AND A GROWING PEOPLE

9.4

Anonymous  
Office of Public Affairs, U.S. Department of Commerce, Washington, D.C., 40 pp. (October 1970). Price \$0.70. Paper copy available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Government Research Announcements 71, No. 13, 36 (July 10, 1971)

The services provided by the Department of Commerce to the economy and to the general public are described.

URANIUM CONTENT AND THE ACTIVITY RATIO URANIUM-234/URANIUM-238 IN MARINE ORGANISMS AND SEAWATER IN THE WESTERN NORTH PACIFIC

6.16

Miyake, Yasuo, Masaru Mayeda, and Yukio Sugimura (Tokyo Univ. Educ., Tokyo, Japan)  
Chemical Abstracts 65:8035, 5, Nov '57

9.6 (9.6)

biology, naval architecture, gear technology, food technology, and economics into the decision-making process. The need, then, is manifest for a comprehensive university course to train people for duty within the administrative and research divisions of fisheries.



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Frank T. Piskur  
Editor



Experiment Station,  
Hoite Bazar, MANGALORE-1.  
5/6/72

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RACEMIZATION OF AMINO ACIDS IN MARINE SEDIMENTS

Wehmiller, John (Lamont-Doherty Geological Observatory, Columbia University, Palisades, N.Y. 10964), and P. E. Hare (Geophysical Laboratory, Carnegie Institution, Washington, D.C. 20008)  
Science 173, No. 4000, 907-911 (September 3, 1971)

Biological amino acids are primarily of the L form. The conversion of these enantiomorphs, with time, to an equilibrium mixture of D and L forms has been observed in a number of sediments and fossil organisms, several investigators noting that the racemization process advances as the age of the material increases. In 1969, two of these investigators (Hare and Mitterer) found that the isoleucine in a deep-sea core from the Antarctic became increasingly racemic with depth. When they compared their data on the rate of racemization of isoleucine with the sedimentation rates determined from paleomagnetic data, they found that these rates and those extrapolated from high-temperature pyrolysis data on actual shell material agreed well. The following year, Bada et al. found that the ratio of alloisoleucine to isoleucine in a core from the Mid-Atlantic Ridge increased with depth. Using high-temperature pyrolysis experiments on solutions of free L-isoleucine, they calculated a sedimentation rate of 0.42 cm./1,000 yr. for this core.

Since isoleucine is one of the slowest amino acids to racemize, the present authors assume that it can serve as an index of the degree of racemization of other amino acids in a sample. Using a series of cores of deep-ocean sediments of known age, they analyzed the kinetics of racemization. They found that a large number of variables affect the apparent rate of the process--temperature, contamination, time, diagenetic reactions, water content, and recovery techniques, for (over)

0.34  
(7.599)

THE CONVERSION OF 2,4-DINITROPHENYLHYDRAZINE DERIVATIVES  
OF MONOCARBONYLS TO ETHYLENETHIOACETALS AND ETHYLENETHIOKETALS  
FOR ANALYSIS BY GAS LIQUID CHROMATOGRAPHY

Metwally, M. M. E., C. H. Amundson, and T. Richardson (Department of Food Science, University of Wisconsin, Madison, Wis. 53706)  
Journal of the American Oil Chemists' Society 48, No. 4, 149-154 (April 1971)

A method for the subject conversion was developed. It depends on heating the 2,4-dinitrophenylhydrazones and 1,2-ethanedithiol either with boron fluoride ethyl ether at 125° C. for 12 min. or with p-toluenesulfonic acid at 200° C. for 15 min.; extracting the reaction with pentane; evaporating the pentane; dissolving the residue in o-xylene, and injecting portions of it into the gas-liquid chromatograph. With the method, the yield from long-chain 2,4-dinitrophenylhydrazones will be in excess of 90%; that from short-chain ones, about 80%. The carbon, hydrogen, and sulfur content, the boiling and melting points, and the retention times on FFAP and SE-30 columns are shown for eight synthesized standard ethylenethioacetals and ethylenethioketals.

This article has been issued as Sea Grant Reprint WIS-SG-71-316.  
[7 figures, 3 tables, 13 references]

LB

0.38  
(1.92)

A COMPARATIVE INVESTIGATION OF THE TISSUE PROTEINASES  
FROM THE LIVER OF VARIOUS SPECIES OF VERTEBRATES INCLUDING MAN

Kazakova, O. V., V. N. Orekhovich, and K. F. Firfarova (Institute of Biological and Medical Chemistry, Academy of Sciences of the USSR, Moscow, U.S.S.R.)  
Biochemistry 35, No. 4, Part 1, 634-640 (July-August 1970) [Biokhimiya 35, No. 4, 721-727 (July-August 1970)]

Cathepsins with a maximum activity at pH 3 were isolated from the livers of two ovipara (pike and hen) and four mammals (rat, pig, ox, and man). Cathepsins from ovipara livers had molecular weights in the order of 150,000; those from the mammals ranged from 40,000 to 70,000. The photodynamic action of methylene blue almost completely suppressed the activity of the enzymes. Diazoacetyl-DNP-ethylenediamine did completely inactivate the cathepsin of pike liver; it caused an approximate 50% loss of activity by the enzymes of the hen and the man; it did not affect the cathepsin of pig liver. Pike-liver cathepsins were somewhat different from the others in that they split the highest number of bonds in the B-chain of insulin and had a decided similarity to pepsin, both in the positions of the histidine-containing peptides (on the peptide maps) and in their suppression by the pepsin inhibitor (diazoacetyl-DNP-ethylenediamine). Moreover they rapidly hydrolyzed carbobenzoxy-glu-tyr (as did the liver cathepsin of the hen).

[6 figures, 2 tables, 16 references]

LB

0.38

ACTION MECHANISM OF FISH GASTRIC HYALURONIDASE

Kitamikado, Manabu, and Hiroshi Yamamoto (Laboratory of Fishery Technology, Faculty of Agriculture, Kyushu University, Fukuoka, Japan)  
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 385-390 (April 1970)

In Contributions From the Department of Fisheries and the Fishery Research Laboratory, Kyushu University, No. 16 (1970)

In 1969, the authors reported that they had found strong hyaluronidase activity in the stomach of fish. They believe that report is the first made of the existence of this enzyme in animal digestive organs. In the present report, they analyze the products of hyaluronidase reaction in mackerel (*Scomber japonicus*) to determine the action mechanism of the enzyme.

Purified hyaluronidase extracted from mackerel gastric mucosa was completely free of  $\beta$ -glucuronidase. The principal reaction products were a series of even-numbered oligosaccharides having an N-acetylhexosamine end group. The chromatographic behavior of these oligosaccharides was similar to that of the products of bovine testicular hyaluronidase; they did not exhibit any characteristic ultraviolet absorption at 232 m $\mu$ . The enzyme acted as a  $\beta$ -endo-N-acetylhexosaminidase; it demonstrated transglycosylation activity. For these reasons, the authors conclude that mackerel gastric hyaluronidase belongs to the same general type as bovine testicular hyaluronidase.

[3 figures, 1 table, 8 references]

LB



McDonald, D. P.  
Mfg Chem. Aerosol News 42, No. 2, 33-34 (1971)  
BFIIRA Abstracts 24, No. 7, Abstract No. 2136, 440 (July 1971)



0.5  
(3.15)

STUDIES ON THE RADIORESISTANCE OF BACILLUS SPORES.  
PART I. COMPARATIVE STUDIES ON THE RADIORESISTANCE AND  
CHEMICAL COMPOSITION OF BACILLUS SPORES

Yamazaki, Kunio (Department of Biology, Tokyo Metropolitan Isotope Research Center, Setagaya-ku, Tokyo, Japan)  
Agricultural and Biological Chemistry 35, No. 9, 1449-1458 (September 1971)

In this study, the researchers determined the radioresistance of the spores of 46 strains of 16 species of the genus Bacillus. Three kinds of sporulating media were used. The spores of the Bacillus showed wide differences in their radioresistance from one species to another and from one strain to another. Furthermore, the radioresistance of the spores depended upon the sporulating medium used.

The radioresistance of the Bacillus spores showed no correlation with their contents of dipicolinic acid, calcium, and magnesium, but showed slight correlation between radioresistance and the molar ratio of Ca to dipicolinic acid or Mg to Ca. In some groups, the radioresistance of the Bacillus spores correlated with their guanine + cytosine content of deoxyribonucleic acid. No correlation existed between heat resistance of the Bacillus spores and radioresistance of the spores. [12 figures, 3 tables, 16 references] FTP

0.5

MODIFIED SELECTIVE AND DIFFERENTIAL ISOLATION MEDIUM  
FOR VIBRIO PARAHAEVOLYTICUS

Twedt, Robert M., and Rose Mary E. Novelli (Division of Microbiology, Food and Drug Administration, Cincinnati, Ohio 45226)  
Applied Microbiology 22, No. 4, 593-599 (October 1971)

J. Baross and J. Liston [Nature (London) 217, 1263-1264 (1968)] formulated a semiselective salt-starch-agar (0.5% soluble starch, 0.3% peptone, 0.1% yeast extract, 0.5% NaCl, 1.5% agar; pH 7.5) for recovery of Vibrio parahaemolyticus from sea fish and sea water. In the present study, the authors systematically examined the effect of each constituent of the formulation on the growth of V. parahaemolyticus and competitive species characteristic of the marine environment. As a result, they developed a modified formulation that consisted of: peptone, 2.0%; yeast extract, 0.2%; corn starch, 0.5%; NaCl, 3.0%; agar, 1.5% (pH 8.0). [7 tables, 14 references] FTP

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This is an aerobic fermentation process for converting hydrocarbons to protein.  
FTP

Food Technology 25, No. 9, 78 (September 1971)

Tanaka, K., K. Yamaguchi, and M. Yamamoto; Kyowa Hakko Kogyo Co. Ltd. (pat.)

0.6  
(3.9)

PRODUCING PROTEINS BY FERMENTATION

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 3

0.6  
(9.1)

REVIEW OF THE FISHERIES RESEARCH BOARD OF CANADA 1969-1970

Anonymous

Review of the Fisheries Research Board of Canada 1969-1970, 217 pp. (1971) (Information Canada, Ottawa, Ontario, Canada) Catalog No. Fs 91-2/1970.

The program of the Fisheries Research Board of Canada is designed to assist in conserving, increasing, and making better use of renewable aquatic resources (fishes, marine mammals, shellfish, other invertebrates, and aquatic plants). The Board's present program is considered under three headings: commercial and recreational fisheries research, environmental research, and products and processing research. This Review describes briefly some of the highlights of activities during 1969-1970 and discusses in more detail the various research programs. The Review also contains a list of personnel and a list of publications and reports for the period. FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 3

0.7  
(0.32) (6.139)

METABOLISM OF HEAT-DAMAGED PROTEINS IN THE RAT. INFLUENCE  
OF HEAT DAMAGE ON THE EXCRETION OF AMINO ACIDS AND  
PEPTIDES IN THE URINE

Ford, J. E., and C. Shorrocks (National Institute for Research in Dairying, Shinfield, Reading RG2 9AT, England)  
British Journal of Nutrition 26, No. 2, 311-322 (September 1971)

Although severe overheating is known to impair the nutritional quality of protein foods, the nutritional consequences and the chemical mechanism of the heat damage have not been established. Growth tests on rats fed heated cod filets have indicated that some of the impairment may be attributed to great differences in the rates of enzymic release of different amino acids. Several investigators have found that although digestibility decreases as the severity of the heat treatment increases, the decrease is not enough to explain the fall in net protein utilization. The indication is that some of the "digested methionine" from the heated proteins may be biologically unavailable. Another possibility is that a significant proportion of the amino acids, even after absorption from the gut, may remain locked in indigestible peptide residues and thus be biologically unavailable. This paper compares the content and the composition of peptides and free amino acids excreted in the urine from rats first fed unheated cod muscle or skim-milk powder and then fed heat-treated cod (heated in an air oven for 20 hr. at 135° C.) or casein (heated either as the cod muscle was or in steam for 4 hr. at 121° C.).

Peptide-bound amino acids excreted by rats fed unheated cod was 18.57 µmol/rat/day; by rats fed heat-treated cod, 48.81 µmol/rat/day. The composition of the peptide also changed with the change in dietary protein--excreted lysine changed from 2.98 µmol (16.0% of the total) to 20.30 µmol (41.6% of the total); aspartic

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 3

(over)



Seshadri, Raja, and John M. Sieburth (Narragansett Marine Laboratory, University of Rhode Island, Kingston, R.I. 02881)  
Applied Microbiology 22, No. 4, 507-512 (October 1971)

In the course of a study of the association of yeasts with seaweed, the authors had to first develop a procedure for the preparation of seaweeds and a satisfactory medium for the cultivation of yeasts. Their results are reported in this paper.

Five-percent suspensions of freshly harvested seaweeds were used as an inoculum. The conditions for satisfactory growth of yeast and for visualization as red colonies on membrane filters were achieved by using a basal glucose-Trypticase-yeast extract-agar at pH 7.0 supplemented with 100 mg. each of chloramphenicol and 2,3,5-triphenyl tetrazolium chloride per liter. Maximal counts were obtained when the algae were triturated in prechilled (4° C.) sea water in a blender for from 2 to 5 min. The phenolic inhibitory materials that are released from phaeophytes during the triturating process were removed by use of a modified Cholodny filtration [H. W. Jannasch and G. E. Jones, *Limnol. Oceanogr.* 4, 128-139 (1959)]. In a preliminary survey, the authors found that yeasts were epiphytic on nine species of seaweeds. [2 figures, 31 tables, 31 references]

FTP

Paul, Kala L., and Richard V. Morita (Department of Microbiology and Oceanography, Oregon State University, Corvallis, Oreg. 97331)  
*Journal of Bacteriology* 108, No. 2, 835-843 (November 1971)

The data suggest that the uptake of amino acids (glutamic acid, glycine, phenylalanine, and proline) by marine bacterium MP-38 is inhibited by high pressure and low temperature, but the respiratory enzymes, necessary for subsequent amino acid metabolism, are not affected to any great degree. Apparently the marine bacteria are unable to grow under pressure because the uptake of amino acids by the bacteria is inhibited under pressure. [11 figures, 19 tables, 19 references]

FTP

Ueyama, Hideo, Yoshihito Yamuchi, Norihiro Tsugi, and Takashi Fukimura (Institute of Physical and Chemical Research, Wako-shi, Saitama, Japan)  
*Journal of Fermentation Technology* 49, No. 7, 581-586 (1971)

This article reports on a taxonomic study of a strain of soil bacteria that could grow in a medium containing isopropyl alcohol as the sole source of carbon. The strain is considered to be a species closely related to *Arthrobacter rufescens*. The organism assimilates various alcohols except methyl alcohol, glycols except ethylene glycol, and n-paraffinic hydrocarbons (C<sub>10</sub> to C<sub>17</sub>). [Abstract and tables in English; text in Japanese]

[2 figures, 7 tables, 9 references]

FTP

acid from 2.83  $\mu$ mol (15.2%) to 6.38  $\mu$ mol (13.1%); and glutamic acid from 5.10  $\mu$ mol (27.5%) to 7.30  $\mu$ mol (15.0%). These three amino acids constituted almost 70% of the total amino-acid residues. The excretion of free amino acids increased correspondingly, from 53.74  $\mu$ mol/rat/day to 114.36  $\mu$ mol/rat/day. The lysine lost in urinary peptide and free amino acids combined amounted to 1.5% of the total lysine ingested via heat-treated cod; via unheated cod, it was 0.3%.

The changes in the composition of the urinary peptide and free amino acids excreted by rats fed similarly heat-treated casein were less marked. Excretion of total urinary peptide did not increase, and the increase in the lysine content of the peptide was smaller than that from rats fed cod. For both proteins, damage to lysine was greater than to methionine.

The results show that no great part of the nitrogen absorbed during digestion of the heat-treated proteins was excreted as unavailable peptide. Assuming the digestibility of the heated cod fillet is 90%, the authors estimate that of the about 0.6 g. of nitrogen absorbed by each rat per day, about 0.2% is excreted as peptide and about 0.6% as free amino acids. These percentages plus those for lysine losses led the authors to conclude that urinary losses of undigested peptide residues are only marginally important nutritionally.

[2 figures, 4 tables, 22 references]

FTP

LB

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Anonymous  
*Nutrition Reviews* 29, No. 11, 253-254 (November 1971)

Pregnant rats are unable to mobilize maternal stores of zinc for the benefit of the fetus. The store of available zinc in the body appears to be small. No information is available on the mechanism by which zinc is bound to the soft tissues of the body.

Joseph, R. L. (Agricultural Institute, Dublin, Ireland)  
*Food Manufacture* 46, No. 10, 29-32, 64 (October 1971)

The author discusses the tenderizing of meat at the farm and processing plant stages. Age of the animals at time of slaughter is related to the tenderness of the beef; the breed and the fatness of the animal apparently are not as important as previously thought. Aging of beef (meat) improves tenderness. The author discusses modern methods of tenderizing meat, the use of enzymes for tenderizing beef, and the relation between the ultrastructure of meat and the tenderness of meat.

[2 figures, 58 references]

FTP







## SHAPING OF FOODSTUFFS

Marshall, Robert Swinburn (Lowestoft, England); assignor to Lever Brothers Co.  
(New York, N.Y.) (pat.)  
U.S. Patent 3,615,686  
Official Gazette of the U.S. Patent Office 891, No. 4, 1526 (October 26, 1971).

This is a method of forming unit portions of foodstuffs such as reformed shrimp. FTP

DLA

This deep fat cooker has multiple annular pocket reels retained on a large cylindrical hub. Food is cooked as the reel pockets (containing the food) move through heated fat.

Official Gazette of the U.S. Patent Office 891, No. 4, 1372 (October 26, 1971)

Hickey, Frank David (San Jose, Calif.); assignor to FMC Corp. (pat.)

## CONTINUOUS COOKER

## 2.3

2.118

# FISHING AND MODERN STORAGE PROCESSES FOR SEA PRODUCTS

Crepey, J.R.  
Ann. Hyg. Langue 6, No. 2, 21-32 (1970) (In French)  
BFMIRA Abstracts 24, No. 7, Abstract No. 2092, 433 (July 1971),

Recommendations are given concerning the freezing and storage of fish. Menhaden is made of the French regulations which require that the core temperature of  $-5^{\circ}\text{C}$  is obtained within two hours and cooled further to  $-18^{\circ}\text{C}$ . Freezing techniques and equipment are discussed, in particular those systems based on cryogenics.

H.M.S. Reprinted

Reprinted

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This antifouling paint, useful in preventing marine growth on ship bottoms, hulls, nets, and piles, contains a synergistic combination of 2-amino-3-chloro-1,4-naphthoquinone, a copper compound (e.g. a basic copper sulfate), and an organic tin compound (tributyl tin fumarate, tributyl tin fluoride), in a suitable vehicle.

Yokoo, Makoto (Toyonaka, Japan), Junj Ogura (Minoo, Japan), and Hiroshi Ikeda (Tatsukushi, Japan); assignors to Takeda Chemical Industries, Ltd. (pat.)  
U.S. Patent 3,615,744  
Official Gazette of the U.S. Patent Office 891, No. 4, 1535 (October 26, 1971)

2.01

2.01 THE MICROBIOLOGY  
(0.5)(2.15) A PROGRESS REPORT

Shewan, J. M. (Torry Research Station, Department of Trade and Industry, Aberdeen, Scotland)  
Journal of Applied Bacteriology 34, No. 2, 299-315 (June 1971)

The author deals with several topics that, although perhaps less interesting technologically, pose basic problems of relatively general interest: the identification and taxonomy of the bacteria found on fresh and spoiling fish, the effects of fish species and of environment on bacterial flora, the effects of handling the fish on floral changes, and the nature and manner of spoilage.

[1 figure, 7 tables, 74 references]

LB

Reprinted

II. COBALT, pp. 675-685.  
(Abstract No. 2368) Data on the cobalt content of foods are reviewed. 32

II. Cobalt; pp. 673-683.

(Abstract No. 2367) Data, collected from 42 references are presented on the zinc content of foods. Such information is of interest since the zinc content of the diet has been connected with diabetes and multiple sclerosis.

I. Zinc; pp. 659-672.

Schlettwein-Gsell, D., and S. Mommsen-Straub  
Int. Z. VitamForschung 40, No. 5, 659-683 (1970) (In German, English summary)  
BFMIRA Abstracts 24, Supplement, 490 (July/August 1971)

## TRACE ELEMENTS IN FOOD.

0.7

2.05

ANTIGENIC SCHEMA AND EPIDEMIOLOGY OF VIBRIO PARAHAEEMOLYTICUS

Zen-Yoji, H., et al.  
Hitch Lab. Sci. 7, No. 3, 100-108 (1970)

BFMIRA Abstracts 24, Supplement, Abstract No. 2375, 491 (July/August 1971)

The presence of *Vibrio parahaemolyticus* in seawater and seafoods is discussed as well as its occurrence in food poisoning outbreaks associated with seafoods. H.M.S. Reprinted

Reprinted

Reprinted

are given or the actual species of *Salmonella* which was found to be the causal agent in food poisoning. The incidence of food poisoning caused by *Salmonella typhimurium* is also reviewed. The largest outbreak resulted from the consumption of custard trifles [cake or fruit served with custard and cream] which caused illness in 63 persons. Cold chicken and jelly and cold chicken and ham also caused large numbers of persons to be admitted to hospital. In the cases of *Clostridium welchii* food poisoning, the vehicle of infection was always meat or poultry. Poisoning due to copper sulphate from a corroded geyser [water heater] was also recorded.

An annual report, by the Public Health Laboratory Service, in which the following details are given of food poisoning outbreaks: frequency of outbreaks, deaths, seasonal variation, location of general outbreaks, vehicles of infection. Under the latter heading particular foods are considered, meat and poultry being

Vernon, E.  
 Publ. Health 84, No. 5, 239-260 (1970)  
 BFMRA Abstracts 24, No. 8, Abstract No. 2687, 553 (August 1971)











# CONTAINER TRAFFIC IN RELATION TO IMPORTED FOOD

Some of the terms associated with the transport of goods in bulk containers are defined, the procedure for examination of such cargos outlined and the advantages and hazards of containerization discussed. (From a paper presented at the Third International Health Conference, Edinburgh, 21-25 September, 1970). C.C.E. Reprinted

Sample, A. B.  
Roy, Soc. Hth J. 91, No. 2, 73-75 (1971)  
BFMIRA Abstracts 24, Supplement, Abstract No. 2555, 526 (July/August 1971)

Reprinted

3.2387 (3.25)

FOOD IN THE THROUGH TRANSPORT SYSTEM

Lunn, H. P.

Roy, Soc. Hth J. 91, No. 2, 78-82 (1971)

BFMIRA Abstracts 24, Supplement, Abstract No. 2553, 525 (July/August 1971)

An outline of the Australia/Europe container service, with reference to container design, ship design, terminals, clearance depots, inland transport, refrigeration and control, is given. Examples of problems which have been encountered in the containerized transport of refrigerated foods, canned foods, confectionery, dried fruit, cereals and coffee, and the steps taken to eradicate them are described and discussed. The public health aspects of this type of transportation of foodstuffs are also dealt with, the three main causes for concern being discussed. C.C.E. Reprinted

3.2387 (3.25)

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3.2387 (3.25)

FOOD IN THE THROUGH TRANSPORT SYSTEM

# ISOVALEROYL TRIGLYCERIDES FROM THE BLUBBER AND MELON OILS OF THE BELUGA WHALE (DELPHINAPTERUS LEUCAS)

Litchfield, Carter (Texas Agricultural Experiment Station, College Station, Tex. 77843), and R. G. Ackman, J. C. Sapos, and C. A. Eaton (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia, Canada) *Lipids* 6, No. 9, 674-681 (September 1971)

Earlier workers have postulated that the melon of fatty tissue in the forehead of the beluga whale and other Odontoceti (dolphins, porpoises, toothed whales) functions as a sound transducer and possibly as a sonic lens in the echolocation process of these animals. Apparently, the sound transmitter for echolocation lies in the nasal passages just behind the melon. The sound is picked up by the fatty tissue in the melon and transmitted, directionally, to the sea water in front of the head of the animal. Furthermore, a fatty oil is closely impedance-matched to sea water and the energy losses during the transfer of sound waves from melon to sea water are quite low [K. S. Norris in "Evolution and Environment," edited by E. T. Drake, Yale University Press, New Haven, Conn., pp. 297-324 (1968)]. In the present study, the authors found that a triglyceride, monoacyl-diisovalerin, constitutes 86.7 mole percent of the melon oil of the beluga whale. Also, the long-chain acyl moiety of this triglyceride is primarily iso and straight chain C11-C17 fatty acids. The authors state that the Odontoceti are the exceptional animals which exploit this acid by incorporating it into their head and blubber oils. They say, further, that this unusual compound may play a role in the echolocation system of the beluga whale.

[4] figures, 3 tables, 33 references]

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 6

FTP

4.5 (0.30)

# LIPID OXIDATION IN MEAT AND MEAT PRODUCTS -- A REVIEW

Love, Jane D., and A. M. Pearson (Food Science Department, Michigan State University, East Lansing, Mich. 48823) *Journal of the American Oil Chemists' Society* 48, No. 10, 547-549 (October 1971)

Oxidation of the lipids of meat or meat products can occur in the stored triglycerides or the tissue phospholipids. Ferric heme pigments appear to be the major prooxidants in tissue lipid oxidation. Oxidation of the pigment and of the lipid are interrelated, and ferric hemes are thought to promote lipid oxidation; as a result of this oxidation the hemes are destroyed. Also, nonheme iron and ascorbic acid may function as prooxidants in meat. Sodium chloride accelerates oxidation of the triglycerides. Cooked meat deteriorates rapidly because of oxidation of the tissue lipids. The cured pink ferrous form of the meat pigment does not promote the rapid oxidation undergone by cooked uncured meat. Chilled and frozen meats are susceptible to lipid oxidation. Lipid oxidation in stored freeze-dried meats may result in protein denaturation and cross linking. Chelating agents as antioxidants are the most effective inhibitors of lipid oxidation in meats. [32 references]

ALA

Hardy, Roy (Torry Res. Stn., Aberdeen, Scotland) *Chemical Abstracts* 74, No. 25, 140307h (June 21, 1971)

# AUTOXIDATION AND ANTIOXIDANTS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 6

4.60 (4.5)

# CUTTLEFISH PROCESSING

Takeda Chemical Inds. Ltd. (pat.)

Japanese Patent 16128/71

*Food Technology* 25, No. 10, 66 (October 1971)

Cuttlefish are treated with a solution of calcium hydroxide before they are pickled in order to improve their texture.

3.8

6 PAGE 3 NO 52 VOL 25

COMMERCIAL FISHERIES ABSTRACTS





4.5 FLUORESCENT PRODUCTS OF LIPID PEROXIDATION OF MITOCHONDRIA AND MICROSOMES

Dillard, C. J., and A. L. Tappel (Department of Food Science and Technology, University of California, Davis, Calif. 95616)  
Lipids 6, No. 10, 715-721 (October 1971)

This paper is a report of studies of lipid peroxidation in liver microsomes and mitochondria and heart sarcosomes from rats fed various levels of  $\alpha$ -tocopherol. The authors indicate that this in vitro lipid peroxidation system provided a biochemical model for the production of fluorescent compounds and for the determination of the quantitative relationships among absorption of oxygen, production of thiobarbituric acid (TBA)-reactants, and development of fluorescence. They found that these relationships were related to dietary polyunsaturated fatty acids and their protection by  $\alpha$ -tocopherol obtained through dietary sources.

[3 figures, 2 tables, 30 references]

FTP  
Maleic acid esters of glycerol fatty esters and butyl cresol or butyl hydroxy anisole derivatives are incorporated into fish products.

Taiyo Kagaku-Kogyo K.K. (pat.)  
Japanese Patent 19575/71  
Food Technology 25, No. 11, 118 (November 1971)

4.61 FISH PRESERVATION

POULTRY RESEARCH -- CONCENTRATE STUDIES

6.193 (6.55)

Anonymous  
Research in Turkey Nutrition at VPI During 1970  
Potter, L. M. (Blacksburg, Va. 24060)  
Feedstuffs 43, No. 51, 24 (December 11, 1971)

During three 4-week experiments, researchers at Virginia Polytechnic Institute examined the effect on turkey body weight of feeding poult diets supplemented with methionine, fish meal, microbiological cultures, dried whey, dried skim milk, or erythromycin thiocyanate. The effects are shown below.

Supplement	Amount added	Increase in body weight %	(over)
Methionine	0.1%	9.8	0
Fish meal	0.2%	13.7	0
Bacillus subtilis	5.0%	7.2	0
Aspergillus oryzae	0.5%	0	0
Liquid streptomycetes solubles	0.05%	0	0
(and an isolate of these solubles)	?	?	?
Western live yeasts	5.1%	5.1	0
(culture-20 and culture 2X-2-5)	5.0%	5.0	0
Lactobacillus acidophilus	5.0%	5.0	0

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 11

6.193 POULTRY RESEARCH -- NORWEGIAN LAYER DIETS (6.55)

Anonymous  
Archiv. für Geflügelkunde 4, 164-169 (1971)  
Solberg, J.  
Feedstuffs 43, No. 50, 22 (December 4, 1971)

The usual diet for laying hens in Norway contains from 16 to 17% protein, an energy concentration of from 2,500 to 2,600 kcal. metabolizable energy (ME) per kilogram and 5 or 6% herring meal. Because of the increasing cost of protein feeds, researchers at the Norwegian Agricultural College are evaluating diets containing no herring meal, or only 13% protein supplemented with methionine and lysine.

When 5% herring meal is included in the diet, daily feed consumption is reduced significantly, although ME intake is basically unaffected. Adding 0.1% methionine or reducing the protein level from 16% to 13% increases the degree of fatty liver. None of the diets improve egg production. However, addition of either 0.05 or 0.1% methionine to the 13% protein diet increases egg weight from an original 54.2 to 56.5, and 58 g., respectively. Adding 0.05, 0.10, or 0.15% methionine to the diet reduces liver weight and the degree of fatty infiltration; the degree of fatty liver is independent on the level of egg production.

Sarti, Domenico M. (Ist. Zootec. Gen., Univ. Perugia, Perugia, Italy)  
Chemical Abstracts 73, No. 1, 1355P (July 6, 1970)

HYDROLYZED-FEATHER FLOUR AS A PROTEIN ADDITIVE IN SWINE FEEDING

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 11

HYGIENIC STUDIES ON LAYER OF KOREA. II. THE EFFECTS OF <sup>60</sup>Co-RAY IRRADIATION ON THE DEFORMATION OF VITAMIN C, ITS BACTERICIDAL ACTIVITY IN PURPLE LAYER

6.33 (3.15)

Park, Dae Sung, Hyun Young Cho, and Kwang Ho Kim  
Kor. J. Microbiol. 4, No. 2, 65-68 (1970)  
Korean Scientific Abstracts 3, No. 2, Abstract No. 71/231, 63 (31) (April 1971)

In continuation of the previous work (The New Medical Journal, Vol. 12, No. 3, coliform groups, on vitamin C content, and on ascorbate oxidase activity of the purple layer were studied.

1. After 0.1 Mrad/hr. of gamma-irradiation for 1 hr., the coliforms were significantly reduced; and after 10 hr., the coliforms were completely destroyed.  
2. Vitamin C content gradually decreased during the gamma irradiation of the layer.

3. Also, the ascorbate oxidase activity was conspicuously decreased by the irradiation.

According to the sensory test, no changes in color appeared after 9-10 hr. of treatment. But the loss of ascorbic acid was much more than that of dehydroascorbic acid after a 10-hr. treatment.

[1 figure, 3 tables, 9 references]

Extractor: LB

Chemical Abstracts 72, No. 25, 128744z (June 22, 1970)

Doshi, Y. A., and P. Srinivasa Rao (Cent. Salt Mar. Chem. Res. Inst., Bhavnagar, India)

EXTRACTION OF AGAROSE AND AGAROPECTIN FROM INDIAN SEAWEEDS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 11

SEASONAL VARIATIONS IN THE CONTENT OF INDIVIDUAL TOCOPHEROLS  
IN ASCOPHYLLUM NODOSUM, PELVETIA CANALICULATA, AND FUCUS SERRATUS  
Jensen, Arne, (Norw. Inst. Seaweed Res., Trondheim, Norway)  
Chemical Abstracts 74, No. 7, 28853g (February 15, 1971)

26.9

6.32 PERIODATE OXIDATION OF THE INSOLUBLE RESIDUE  
AFTER SEVERE EXTRACTION OF SOME MARINE ALGAE  
Young, E. Gordon (Acl. Reg. Lab., Nat. Res. Council, Canada, Halifax, Nova Scotia,  
Canada)  
Chemical Abstracts 74, No. 7, 28860g (February 15, 1971)

CHEMICAL CONSTITUENTS OF AUSTRALIAN BULL KELP, DURVILLEA POTATORUM  
Madgwick, John C., and Bernhard J. Ralph (Sch. Biol. Technol., Univ. New South  
Wales, Kensington, Australia)  
Chemical Abstracts 74, No. 7, 28856k (February 15, 1971)

26.9

6.32 MUCILAGINOUS SUBSTANCES OF RED SEaweeds (RHODOPHYCEAE).  
XVII. ELECTROPHORETIC BEHAVIOR OF RED SEaweED MUCIAGE  
Akahane, Tooru, and Kakui Katsura (Numazu Tech. Coll., Numazu, Japan)  
Chemical Abstracts 72, No. 17, 87160k (April 27, 1970)

(55.9) 193.9

Supplement		Amount added		Increase in body weight	
				%	
				5.5 and 8.5	
				2.5	
				1.9	
				12.4	
				5.0%	
				2.5%	
				20 g./ton	
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Kyowa Hakko Kogyo Co., Ltd. (pat.)  
Japanese Patent 7516/71  
Food Technology 25, No. 9, 78 (September 1971)

A reclaimed tangle product is prepared from waste tangle.

FTP

Seasoned tangle is cooked, then dried to moisture content of 14-16%. The dried material is coated with carboxymethylcellulose and salted with sodium chloride containing sodium glutamate.

FTP

## 6.37 TANGLE PRODUCT

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 13

Yasuda Shokuhin Kogyo Co. Ltd. (pat.)  
Japanese Patent 14711/71  
Food Technology 25, No. 9, 78 (September 1971)

## 7.0 SIMULTANEOUS DETERMINATION OF FAT, MOISTURE, DEFATTED DRY MATTER AND ASH IN MEAT, FISH AND BIOLOGICAL MATERIALS

(7.53)(7.41)  
(7.43)

Lunder, T. L. (Research Department, Nestle Ltd., Lausanne, Switzerland)  
Laboratory Practice 20, No. 7, 572-573 (July 1971)  
WIN 71P, England

The apparatus described allows the simultaneous determination of fat, moisture, dry matter, and ash on the same sample of biological material. The equipment may be used on sausages, meat, and fish flesh. The results obtained with the apparatus agree with those of the methods of the Association of Official Analytical Chemists. [1 figure, 1 table]

FTP

Errors in the identification of objects have been made as a result of faulty interpretation of their flat images or sections. Such misinterpretations can lead to perpetuated errors. In this article, the author describes the mechanism of establishing and perpetuating erroneous concepts relative to histology and other sciences based on the examination of sections. He suggests ways for correct initial identification of shape and structure and for breaking the circuit of erroneous thinking. [16 figures, 18 references]

FTP

## 7.0 THREE-DIMENSIONAL STRUCTURE IDENTIFIED FROM SINGLE SECTIONS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 13

Elias, Hans (Chicago Medical School, Chicago, Ill.)  
Science 174, No. 4013, 993-1000 (December 3, 1971)

## AUTOMATIC COLORIMETRIC DETERMINATION OF N-NITROSO COMPOUNDS

Fan, Tsai-Yi, and Steven R. Tannenbaum (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139)  
Journal of Agricultural and Food Chemistry 19, No. 6, 1267-1269 (November-December 1971)

This paper describes a procedure for the automatic analysis of any type of N-nitroso structure. This new method was adapted from the classical approach of cleavage of the compound by ultraviolet irradiation followed by analysis of released nitrite by diazotization and coupling to form a dyestuff.

FTP

[3 figures, 2 tables, 17 references]

## ANTIMICROBIAL SUBSTANCES IN ALGAE. 3. QUANTITATIVE DETERMINATION OF ACRYLIC ACID IN SEA ALGAE

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 13

Glombitza, Karl W. (Pharmakognostisches Inst., Univ. Bonn, Bonn, Germany)  
Chemical Abstracts 73, No. 19, 95311w (November 9, 1970)

## THE RAPID DETECTION AND DETERMINATION OF SPARSE BACTERIAL POPULATIONS WITH RADIOACTIVELY LABELLED HOMOLOGOUS ANTIBODIES

(19.6)

Strange, R. E., E. O. Powell, and T. W. Pearce (Microbiological Research Establishment, Porton Down, Salisbury, Wiltshire, England)  
Journal of General Microbiology 67, Part 3, 349-357 (August 1971)

Most of the methods proposed for rapidly detecting and determining small microbial populations in liquid samples have broad spectrum capability--that is, the microbes present can be detected but not specifically identified. Even if the broad spectrum principles are sound and the sensitivities claimed for the methods are realistic, detection in a number of situations is inadequate without identification. For example, such methods would not show the presence of relatively small numbers of a specific microorganism, an infective bacterium, say, in natural waters, where the microbial flora vary qualitatively and quantitatively over wide ranges.

Most of the methods reported for the rapid, specific identification of microbes are based on immunofluorescence, with either fluorescent dyes or radioactive isotopes of iodine as labels for antibody proteins. Although theoretically an assay based on bacterial uptake of radioactively labeled antibody should be very sensitive, in practice determination of a few bacteria is possible only if, after separation of the labeled immune complex, the variation in the level of nonspecifically attached radioactivity is less than the radioactivity of the immune complex. However, if residual, nonspecifically attached radioactivity (determined by testing blank samples without bacteria) is higher than the radioactivity of the immune complex, even small variations will swamp the signal from the complex. The method described here largely solves the problem of high erratic blank

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 3 PAGE 13

(over)

7.86 (9.19)

values. Under the conditions recommended, it permits detection of about 500, minimum, vegetative bacteria or bacterial spores within from 8 to 10 min.

Briefly, a sample is treated with  $^{125}\text{I}$ -labeled antibodies within from 5 to 10 min., and then filtered and washed on a Millipore membrane filter. The radioactivity of the separated, labeled, immune complex is then measured. The method is specific and accurate, and rapid. Its sensitivity depends on the time allowed for labeled antibody to react with the bacteria—5 or 6 min. is adequate for sparse populations, less time for larger populations. Both sensitivity and accuracy decrease if the samples contain particulate matter that nonspecifically attaches antibody and is retained by the membrane filter. However, if the samples are pretreated with clarified normal rabbit serum for a few minutes before the assay is begun, this type of interference can be avoided.

[3 figures, 1 table, 12 references]

LB

[7 tables, 92 references]

FTP

This paper contains a compilation of the amino-acid content of 120 proteins; the analyses reported are mainly from those published within the last 3 years.

Analytical Biochemistry 44, No. 1, 159-173 (November 1971)

## 8.51 A COMPILATION OF AMINO ACID ANALYSES OF PROTEINS. I.

7.599 THE DETECTION AND ESTIMATION OF TRACE AMOUNTS OF N-NITROSAMINES IN A FOOD MATRIX

Walters, C. L. (British Food Manufacturing Industries Research Association,  
Leatherhead, Surrey, England)  
Laboratory Practice 20, No. 7, 574-578 (July 1971)

This paper is a review of the published methods for the separation and detection of any N-nitrosamines available in a food matrix. The author stresses the need for unequivocal detection procedures. He describes the separation and concentration of a volatile N-nitrosamine by fractional distillation of its aqueous methanolic solution and its estimation in the products by polarography, gas chromatography, and release of nitrite on ultraviolet irradiation.

PLA

[1 table, 39 references]

### 6.5.54 IMITATION MEAT EXTRACT

Ralston Purina Co., U.S.A. (pat.)  
Patent 1,937,027

British Patent 1,234,927  
DEMTA Abstracts 3/ No

BFMIRA Abstracts 24, No. 8, Abstract No. 2825, 579 (August 1971)

A solution of defatted fish solubles is heated at 180-205° F at pH 6-9, under agitation in the presence of a reducing sugar, to develop a beef-like flavour.

Reprinted

Reprinted

The product is a nutritionally balanced food. Flavours may be added.

A solid balanced food product is made by mixing protein and carbohydrate in the presence of air to form a porous, cellular, non-crystalline material which is then dried to less than 5% moisture. The dried product is then converted to granular or powder form, mixed with granular or powdered fat and moulded to a desired shape. The product is a nutritionally balanced food. Flavours may be added.

BFMIRA Abstracts 24, No. 8, Abstract No. 2820, 579 (August 1971)

White, J., and H. E. Shears; Beecham Group Ltd. (pat.)  
British Patent 1,234,462

British Patent 1,234,462

#### 7.42 DETERMINATION OF CHROMIUM IN PLANTS AND OTHER BIOLOGICAL MATERIALS

IMPROVEMENTS IN AND RELATING TO EDIBLE MATERIALS

(3.63)

7.42

Cary, Earle E., and William H. Allaway (Plant, Soil, and Nutrition Laboratory,  
U.S. Department of Agriculture, Ithaca, N.Y. 14850)

Journal of Agricultural and Food Chemistry 19, No. 6, 1159-1161 (November-December 1971)

This atomic absorption method for the determination of chromium in biological materials allows the estimation of 4 ng. of chromium per ml. of solution and is free from interferences. By this method, the biological materials are wet digested, the chromium III is isolated from other metals by solvent extraction, and the chromium III chelate of 2,4-pentanedione is extracted into chloroform. Further, the chloroform is evaporated and the chromium compound is taken up in 4-methyl-2-pentanone. The authors indicate that the recovery of added chromium-51 in the digestion step when silver nitrate was present was 100%.

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ДЛЯ

### 3 figures, 6 references

The researchers developed a new type of atomic absorption spectrometer that can detect trace mercury in host material to about 0.04 p.p.m. in 1 min. Chemical separation of the mercury from the host material is not necessary. The apparatus was tested for the determination of mercury in tuna.

Hadeishi, T., and R. D. McLaughlin (Lawrence Radiation Laboratory, University of California, Berkeley, Calif. 94720)  
Science 174, No. 4007, 404-407 (October 22, 1971)

Science 174, No. 4007, 404-407 (October 22, 1971)

The researchers developed a new type of atomic absorption spectrometer that



8. OBSERVATIONS ON THE CHEMICAL COMPOSITION AND TOXICITY OF RATFISH (CHIMAERA MONSTROSA)

Hardy, R., and P. R. Mackie (Torry Research Station, Department of Trade and Industry, Aberdeen, Scotland)  
Journal of the Science of Food and Agriculture 22, No. 7, 382-388 (July 1971)

In view of the possibility that substantial quantities of ratfish may be present in some catches of fish used for fish meal, the authors determined the chemical composition of the ratfish and tested various tissues of the ratfish for toxicity to mice. For the toxicity tests, extracts of the homogenized tissue were injected intraperitoneally into mice. Tables of data are given showing results of toxicity experiments; lipid class composition; fatty acid composition of total oils; fatty acid composition of the phospholipids, free fatty acids, and sterol esters; fatty acid composition of o-tri-substituted glycerols; fatty acid composition of o-di- and mono-substituted glycerols; glyceryl ether and aldehyde composition; proximate composition of the flesh; protein and amino-acid composition; and free amino-acid composition.

The authors indicated that the o-tri-substituted glycerols were similar in composition to those of the Pacific ratfish Hydrolagus colliei but contained a larger proportion of polyunsaturated acids. Further, the phospholipids were more saturated than is normally the case with marine lipids. The various tissues of the fish (after varying periods of storage) were found to be nontoxic. The flesh was pleasant to eat. [10 tables, 25 references] FTP

8.51 (1.30) (9.13)

ÉTUDE DES DIVERS COMPOSÉS AZOTÉS DES SALMONIDÉS: PROTÉINES, AZOTE NON PROTÉIQUE, ACIDS NUCLEIQUES. FACTEURS DE VARIATION [STUDY OF THE DIFFERENT NITROGENOUS COMPONENTS OF SALMONIDAE: PROTEINS, NON-PROTEIN NITROGEN, NUCLEIC ACIDS. VARIATION FACTORS]

Luquet, P. (Station centrale de Nutrition, Centre national de Recherches zootechniques, 78 - Jouy-en-Josas, France)  
Annales d'Hydrobiologie 1, No. 2, 111-132 (1970) (In French; English summary) Service des Publications. Institut National de la Recherche Agronomique. Route de Saint-Cyr, 78, Versailles, France)

In this literature survey, the author reviews the main works dealing with the nitrogen composition of Salmonidae. Among the numerous factors that affect the raw protein content (N%6.25) and the distribution of protein nitrogen, particularly in the muscle, the major effect of the sexual cycle is emphasized. A special section of the review is devoted to the content and composition of the nucleic acids. [15 tables, 87 references] LB

9.13 (0.38) THERMAL COMPENSATION IN THE STOMACH OF THE BROOK TROUT (SALVELINUS FONTINALIS MITCHELL)

Owen, T. G., and A. J. Wiggs (Department of Biology, University of New Brunswick, Fredericton, New Brunswick, Canada)  
Comparative Biochemistry and Physiology 40, No. 2B, 465-473 (October 15, 1971)

Thermal compensation in the stomach of the brook trout was studied by determining if qualitative or quantitative pepsin alterations occurred as a result of temperature acclimation to 5° and 12° C.

No qualitative differences were found as indicated by the pH and rate-temperature curves for the enzyme. However, quantitative differences did occur; extracts of gastric mucosa from 5° C. trout exhibited 30% greater activity than did those from 12° C. trout.

[4 figures, 26 references] FTP

9.16 (9.6) BOOK CHAT

Heighway, Arthur J.  
Fishing News International 10, No. 9, obv. 92 f. (September 1971)

This announcement includes that of a new journal and four books devoted to fish culture--distinct from the fish hunting now practiced by marine fisheries.

The new journal will appear in mid-1972. Although a companion to Fishing News International, it will be specialized, devoted to the specific, practical culture of fish. Its aim is to give down-to-earth information on the many diverse factors necessary for achieving success in breeding, cultivating, fattening, processing, and marketing fish. It will be edited by Peter Hjul, who will be backed by the editorial resources and staffs of Fishing News, Fishing News International, and Fishing News (Books) Ltd.

An English translation of Marcel Huet's Traite de Pisciculture will be issued under the title Breeding and Cultivation of Fish. It will appear in early 1972. A translation, by Ichiro Hayashi, of Atsushi Usui's Eel Culture Techniques is also in the publisher's hands. A book by P. H. Milne on the hydrographical and engineering essentials for laying out a modern fish farm, particularly in a marine environment, will be issued early in 1972; and a commissioned book by G. T. Samuel (of the Oceanographic Laboratory, Cochín, India) on the coastal and domestic fish farming in Eastern Asia is also forthcoming.

Full booklists are available on request from Fishing News (Books) Ltd., 110 Fleet Street, London E.C.4.A. 2JL, England.

SEASONAL VARIATIONS IN THE CYANOPHILS AND THE GONADOTROPIC POTENCY OF THE PITUITARY IN RELATION TO GONADAL ACTIVITY IN THE CATFISH, MYSTUS VITATUS

Singh, I. P. (Dep. Zool., Banaras Hindu Univ., Varanasi, India)  
Chemical Abstracts 74, No. 6, 39853h (March 1, 1971)

(1.61) (26.1)

6.13

<p>9.16 (0.119)</p> <p>HATCHERY FOR BRINE SHRIMP EGGS OR THE LIKE</p> <p>Huslin, Stanley C. (1503 Foulkrod St., Philadelphia, Pa. 19124) (pat.) U.S. Patent 3,604, 395 (September 14, 1971)</p> <p>The eggs of brine shrimp (<u>Artemia salina</u>) can be bought in dried form, stored till needed, and then hatched in saline solution at room temperature. Since aeration of the saline solution increases the yield of shrimp from a given batch of eggs, the inventor's objective was to devise a relatively simple, easily used apparatus that would improve the yield of hatchery-produced shrimp.</p> <p>LB</p> <p>-----</p> <p>In a study on ways to improve the yield of meat, crabs (<u>Cancer pagurus</u>) were confined in a basin and fed artificially for 3 mo. The results show that artificial feeding is possible. The percent of brown body meat increased more in females than in males. [1 figure]</p> <p>LB</p>	<p>9.16 (1.86)</p> <p>STUDIES ON THE BIOMASS OF A CRAB, <u>ERIOCHEIR SINENSIS</u> AND ENVIRONMENTAL FACTORS IN ITS HABITAT</p> <p>Ryu, Bong Suk Kor. J. Limnol. 3, No. 1-2, 35-43 (1970) Korean Scientific Abstracts 3, No. 2, Abstract No. 71/213, 58 (26) (April 1971)</p> <p>The author has examined breeding in the crab <u>Eriocheir sinensis</u> for the purpose of its cultivation. A number of basic environmental factors which influence their biomass were investigated, and the results are as follows.</p> <ol style="list-style-type: none"> <li>1. The biomass of <u>Eriocheir sinensis</u> is chiefly restricted to 20-30 cm. water depths.</li> <li>2. <u>E. sinensis</u> is chiefly a night-traveler, but it also travels in the day when the depth of the water is less than 40-50 cm.; it snuggles down when the water is deeper.</li> <li>3. The optimum water temperature in the habitat of <u>E. sinensis</u> is 20°-25° C. The marginal living limit ranges from under 7° C to over 35° C.</li> <li>4. The bottom sediment in the habitat of <u>E. sinensis</u> is mixed--very coarse sand 23.3%, coarse sand 25.7%, fine sand 45.1%, and clay 5.8%.</li> </ol> <p>[8 figures, 7 tables, 7 references]</p> <p>Extractor: LB</p>
<p>9.14 (1.86)</p> <p>FORINGSFORSØK PÅ KRABBE [FEEDING OF CRABS]</p> <p>Gundersen, Kaare R. (Fiskeridirektoratets Havforskningsinstitutt) Fisken og Havet, No. 2, 14-16 (1970) (In Norwegian; figure and summary in English)</p> <p>In a study on ways to improve the yield of meat, crabs (<u>Cancer pagurus</u>) were confined in a basin and fed artificially for 3 mo. The results show that artificial feeding is possible. The percent of brown body meat increased more in females than in males. [1 figure]</p> <p>LB</p>	<p>9.16 (9.14)(1.89)</p> <p>BREEDING EXPERIMENTS OF A MARINE LITTORAL COPEPOD <u>TIGRIOPUS JAPONICUS</u> MORI</p> <p>Takano, Hideaki Bulletin of the Tokai Regional Fisheries Research Laboratory No. 64, 71-80 (January 1971)</p> <p>This experiment was conducted in an effort to find another source of food, besides <u>Artemia salina</u>, for cultivated marine animals. <u>Tigriopus japonicus</u>, a harpacticoid copepod, was chosen because it is one of the fastest growing of the microcrustaceans living in brackish and marine environments.</p> <p>First, the best food for inducing the copepod to produce the greatest number of broods in the shortest time was determined. A 1:1 mixture of wheat flour and soya flour maintained at least 12 successive generations under nonsterile conditions; however, a mixture of cereal flour and cultivated microalgae seemed to be the best food over a long period of time. The shortest time between generations was 12 days; the usual number of nauplii in a brood was between 20 and 35; and the greatest number of broods produced by a female was 11.</p> <p>Then the acceptability of the copepod as food was tested on arrow worms. The results were similar to those of Ito (1970), who found that blue goby larvae (3 mm. long) would not eat adult <u>T. japonicus</u> because of their large size and tough body shells. He therefore suggests that only the nauplii be fed to small-sized fish larvae. [3 tables, 23 references]</p> <p>LB</p>
<p>8.50 (7.50)(6.190)</p> <p>DETERMINATION AND COMPOSITION OF FISH EXTRACTS</p> <p>Bales, Werner (Inst. Org. Chem. Biochem., Univ. Hamburg, Hamburg, Germany) Chemical Abstracts 75, No. 9, 62289h (August 30, 1971)</p>	<p>9.14 (1.86)</p> <p>FORINGSFORSØK PÅ KRABBE [FEEDING OF CRABS]</p> <p>Gundersen, Kaare R. (Fiskeridirektoratets Havforskningsinstitutt) Fisken og Havet, No. 2, 14-16 (1970) (In Norwegian; figure and summary in English)</p> <p>In a study on ways to improve the yield of meat, crabs (<u>Cancer pagurus</u>) were confined in a basin and fed artificially for 3 mo. The results show that artificial feeding is possible. The percent of brown body meat increased more in females than in males. [1 figure]</p> <p>LB</p>



9.19 EGGSHELL THINNING IN JAPANESE QUAIL FED MERCURIC CHLORIDE

Stoewsand, Gilbert S., Judy L. Anderson (Department of Food Science and Technology, New York State Agricultural Experiment Station, Cornell University, Geneva, N.Y. 14456), and Walter H. Gutenmann, Carl A. Bache, and Donald J. Iisk (Department of Entomology, New York State College of Agriculture, Cornell University, Ithaca, N.Y. 14850)  
Science 173, No. 3001, 1030-1031 (September 10, 1971)

Japanese quail (*Coturnix coturnix japonica*) fed 1 to 8 parts of mercury (added to the diet as HgCl<sub>2</sub>) per million for 10 weeks produced eggs with thinned shells. The total amounts of mercury in the tissues of quail were proportional to the dosage given and were higher in the males than in the females. Methylmercury was not present in the muscle, kidney, eggs, or feathers of the quails fed the mercuric chloride. [1 figure, 1 table, 15 references]

FTP

THE DETERIORATION OF THE OYSTER INDUSTRY IN NORTH CAROLINA  
[1961] 126-127 'ansu Issue Special Troil 'M William and 'M Travis North Carolina Law Review  
ESTUARINE POLLUTION IN NORTH CAROLINA  
(3'6)  
61'6

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 3 PAGE 17

9.19 THE NATION'S RIVERS

Wolman, M. Gordon (Johns Hopkins University, Baltimore, Md. 21218)  
Science 174, No. 4012, 905-918 (November 26, 1971)

Problems encountered in appraising trends in the quality of waters and rivers are discussed. The author states that the few data available and the small number of investigators concerned with evaluating trends in the quality of the rivers of the United States suggest three specific conclusions: (1) None of the programs was designed specifically to measure the quality of the rivers or the river environment. The sampling programs were intended to emphasize the measurement of specific characteristics related to the use of water by industry and municipalities. Few of the observational programs combined the hydrology with measurements of water quality, river characteristics, and biology. This lack of coordinate observations makes long-term comparisons almost impossible. (2) Substitute measurements for water quality and easily measured parameters may shed little light on the dynamics of the processes active in river systems. Such measures are of limited use in estimating the likelihood of reversing specific observed trends in the absence of a knowledge of their causes. Therefore, more attention must be given to measuring parameters related to models of river behavior and to estimating inputs based on budgets of materials derived from industrial outputs and land use. (3) Because of the difficulty of observation, too little attention has been given to the variability of biological activity and physical aspects associated with natural variations and cycles in rivers. Many measurements on biological effects are carried out during low and summer flows when measurements are easy. Also, one common trend in river management is the progressive regulation of flow through the

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9.19

MERCURY IN THE ENVIRONMENT: A SUMMARY OF INFORMATION PERTINENT TO THE DISTRIBUTION OF MERCURY IN THE SOUTHERN CALIFORNIA BIGHT

Young, David R. (Southern California Coastal Water Research Project, 1100 Glendon Ave., Los Angeles, Calif. 90024)  
Southern California Coastal Water Research Project Report, 31 pp. (November 1971)  
Price \$1.70.

Mercury is introduced into southern California coastal waters through various means--both natural and man-related, and relatively little is known of its fate in the marine environment or its possible effects on the public health or the health of local marine organisms. A review of published and unpublished data on mercury in marine and freshwater reservoirs revealed that there have been, to date, only a few studies dealing specifically with the distribution of mercury in the Southern California Bight; therefore, average background levels of mercury in the Bight can only be roughly estimated at present. Existing data on mercury input to the Bight through sewage effluent, surface runoff, aerial fallout, and advection via ocean currents are supplemented with extrapolations of global mercury input estimates and used to calculate the order of magnitude and relative importance of each of these sources: The calculations indicate that the advective input is the major source of mercury to the Bight; however, advection is also probably the primary means of output, and the net effect of the total process is yet to be determined. Chemical data, obtained primarily from studies of freshwater systems, provide insight into the ways in which inorganic mercury may be transformed into more toxic organic forms and taken up by the biota. Parallel

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(over)

9.19 REGENERATIVE FUNCTIONS AND MICROBIAL ECOLOGY OF CORAL REEFS (7.43)(1.9)

Di Salvo, Louis M., et al. (Naval Biomedical Research Laboratory, University of California, Berkeley, Calif. 94720)  
Canadian Journal of Microbiology 17, No. 8, 1081-1100 (August 1971)

The regeneration function as used here is the sum of the respiratory and the mineralization processes that lead to the release of small molecules and compounds potentially available for recycling into the productive processes of the ecosystem. I. "Assays for Microbial Population," Louis H. Di Salvo and K. Gundersen (Department of Microbiology, University of Hawaii, Honolulu, Hawaii 96822), pp. 1081-1089.

In this part of the report, the authors report "total" counts of heterotrophic bacteria in coral reef regenerative sediments; results of attempts to culture the bacteria on solidified media containing (as energy sources) low-solubility organics that are biochemically representative of the natural products that are likely to occur in reef organic detritus; and a sediment recovery and ashing procedure developed to provide a quantitative basis for comparison of bacterial counts and sediment quantities sampled from different stations. They also propose that the regenerative system of the reef functions like a trickling sewage filter, for it has extensive well-aerated surfaces supporting diverse microbial populations that are adapted to mineralize organic matter. [5 figures, 5 tables, 21 references]

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(over)

9.19 DISTRIBUTION OF REDUCED INORGANIC COMPOUNDS  
AND THEIR OXIDATION IN LAKES

Nikaido, Motomu (Biological Institute, Ehime University, Matsuyama, Japan)  
Memoirs of the Ehime University, Natural Science, Series B (Biology) 6, No. 3,  
27-40 [159-172] (December 1970) (Published by the Ehime University, Matsuyama, Japan)

The author proves that oxygen consumption in the hypolimnion of eutrophic lakes and in streams polluted by organic substances is due not only to the respiration of organisms and the biochemical oxidation of the organic substances but also to the chemical oxidation of such reduced inorganic compounds as ferrous iron, hydrogen sulfide, iron sulfide, and sulfide sulfur. The effect of the physicochemical characteristics of the water (such as temperature, pH, and co-existent substances) on the chemical oxidation processes of these reduced substances will be reported later.  
[10 figures, 5 tables, 12 references]

LB

9.19 TREATMENT OF WASTE WATERS FROM FISH AND MEAT PROCESSING PLANTS

Tsuchiya, Hikogi (Inst. Drain., Organo Co., Ltd., Japan)  
Chemical Abstracts 75, No. 6, 40099u (August 9, 1971)

BT

[5 figures, 3 tables, 19 references]

Oxygen consumption of nonliving coral heads and of sediment suspensions obtained from nonliving coral heads was measured; the diurnal oxygen content of invertebrate waters was compared with that of ambient reef waters; normal sediment metabolism was compared with that of antibiotic-treated sediments; and oxygen debts of waters within inshore reefs were compared with those of offshore reef waters. Because the rate of metabolism in reef regenerative systems is rapid, such unused environmental stresses as excessive siltation or fresh-water influes may interfere with sediment processing by infaunal reef macroorganisms. Mechanical stress and organic loading discharge of bagasse fiber and other sugar wastes over coral reefs is one such example (will similarly disrupt reef regenerative functioning). During periods of oxygen stress, the evolution of sulfate reducers drives out motile organisms and poisons sessile ones. Thus a reef is deprived of its sediment-processing mechanism.

(6.1.1)(37.7) 61.6

9.19 INFLUENCE OF PESTICIDES ON WATER AND THE HUMAN ENVIRONMENT

Stangenberg, Marian (Wyzsz. Szk. Roln., Wroclaw, Poland)  
Chemical Abstracts 74, No. 25, 139883m (June 21, 1971)

Stangenberg, Marian (Wyzsz. Szk. Roln., Wroclaw, Poland)  
Chemical Abstracts 74, No. 25, 139883m (June 21, 1971)  
[see references 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

SURFACED WATER VERSUS SUBSURFACE WATER: SURFACED WATER VERSUS SUBSURFACE WATER  
EUTROPHICATION AND DETERGENT PHOSPHATE

Oba, Kenichi (Environmental Sanitation Section, Lion Fat and Oil Co., Hiral, Edogawa-ku, Tokyo, Japan), and Shinichi Tomiyama (Lion Fat and Oil Co., Yokohama, Sumida-ku, Tokyo)  
Journal of Japan Oil Chemists' Society 20, No. 6, 46-56 [368-378] (June 1971)  
[In Japanese]  
[5 figures, 4 tables, 98 references]

BT

[5 figures, 4 tables, 98 references]

Because the demands on the waters of the rivers are increasing, the author suggests that the concept of threshold and irreversibility must be studied on place and specific rivers where large-scale control or cleanup programs have been implemented. Observations designed to support the enforcement of standards may not themselves provide satisfactory measures of thresholds, trends, or reversibility. Trends, 69 figures, 7 tables, 69 references]

61.6



<p>9.2 (9.6)</p> <p>MARINE DECISIONS UNDER UNCERTAINTY</p> <p>Devanney, John W., III (Massachusetts Institute of Technology, Cambridge, Mass. 02139) Report No. MITSG 71-7, xii + 203 pp. (November 1971) (Published by Cornell Maritime Press, Inc., Cambridge, Md. 21613) \$6.50</p> <p>Few executives face uncertainties of the type and magnitude that the marine investor and operator must face. Yet the systematic treatment of uncertainty has received little attention in marine practice or marine literature. This book attempts to remedy that deficiency.</p> <p>The first three chapters are addressed primarily to the practicing marine decision maker. They introduce him to the basic elementary concepts of decision making under uncertainty, to Bayesian decision theory, and to the concept of dynamic programming. The final three chapters apply these techniques to a representative spectrum of marine problems that involve a substantial degree of uncertainty. They also provide the theoretical analyst with illustrative examples of some of the more challenging problems the practicing marine decision maker must solve. Chapter 4 focuses on the alternatives open to investors in marine transportation; chapter 5, on marine hardware maintenance problems; and chapter 6, on marine search and exploration problems.</p> <p>[33 figures, (plus numerous graphic illustrations in the text), 2 tables, 23 references] LB.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 3 PAGE 19</p>	<p>9.2 (9.19)</p> <p>POLLUTION PRICES IN A GENERAL EQUILIBRIUM MODEL</p> <p>Ruff, Larry E. (Department of Economics, University of California, San Diego, Calif.) Sea Grant Publication No. 12 (IMR Reference No. 72-3), 25 pp. (May 1970) (Institute of Marine Resources, La Jolla, Calif. 92037)</p> <p>The analysis of the pollution problem begins with a brief discussion of existing methods of economic decision making and control, upon which most existing and proposed pollution programs are based. It is argued that benefit-cost analysis and direct regulation are totally inadequate tools for the more complex pollution problems. Ultimately, a political-economic process will have to make decisions about pollution policy and great care must be taken in designing this process. It is suggested that an explicit distinction be made between those decisions which must be made politically and those which are best made by economic calculation, and that institutions be structured accordingly. On the economic side a quasi-market in pollutants is shown to be capable of achieving specified pollution levels "efficiently" in a competitive general equilibrium model, where efficiency is defined in a sense related to, but distinct from, Pareto optimality; and the market "prices" are shown to be estimates of the marginal cost of pollution reduction. The political process can then decide the matters of welfare distribution and desired pollution levels. Finally, the practicality of the price system for pollution control is considered, and it is argued that such a system is probably the best solution for the worst problems. In fact, the more difficult the problem of control, the greater advantage the price system has over its alternatives. [2 figures, 10 references]</p> <p>Author's introduction reprinted in part</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 3 PAGE 19</p>
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<p>9.2</p> <p>AN EXPERIMENTAL STUDY OF SEAFOOD MERCHANDISING STRATEGIES IN A SUPERMARKET</p> <p>Gillespie, Samuel M., and Stephen M. Loomis (Department of Marketing, Texas A&amp;M University, College Station, Tex. 77840) Sea Grant Program of Texas A&amp;M University, Report No. TAMU-SG-71-221, viii + 139 pp. (November 1971) (College Station, Tex. 77840)</p> <p>This research study examines the effects of planned implemented merchandising strategies on the sales and profits of a retail fresh seafood market located within a local Bryan, Texas supermarket. Two major objectives of the study were to determine if:</p> <ol style="list-style-type: none"> <li>1. Sales volume and profitability of fresh seafood products may be increased by planned merchandising strategies.</li> <li>2. The increased sales volume and profitability may be accomplished without taking a disproportionate share of normal supermarket operating funds.</li> </ol> <p>In addition to a period of observation, three planned merchandising strategies were implemented during the study; a low cost merchandising plan involving only procedural changes; an average cost merchandising effort involving light promotional expenditures; and a high cost merchandising strategy consisting of heavy promotion of fresh seafood products.</p> <p>It was shown that each successive experimental merchandising strategy produced greater sales and profits of fresh seafood items. In addition, incremental analysis showed that these increases did not take a disproportionate share of supermarket funds as each successive experimental merchandising effort showed sizeable incremental rates of return.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 3 PAGE 19</p>	<p>9.19 (9.3)</p> <p>POLLUTED WATER -- A CHALLENGE TO FORENSIC BIOLOGY</p> <p>Wilber, Charles G. (Department of Zoology, Colorado State University, Fort Collins, Colo. 80521) Journal of Forensic Sciences 16, No. 3, 251-268 (July 1971)</p> <p>Regardless of one's precise definition of the term, the aim of forensic science is toward furthering the objectives of the law. Law concerns itself not only with criminal cases but also with civil matters and with matters of general equity. The view in our present-day society is that law must address itself to problems of overall concern to society at large. The idea of the common good is becoming an increasingly significant factor in litigation, especially in matters concerning the environment. This presentation, given at the Twenty-Third Annual Meeting of the American Academy of Forensic Sciences (held in Phoenix, Ariz., on February 22, 1971) is addressed primarily to problems associated with pollution of the aquatic environment.</p> <p>Since pollution of natural waters harms the plants and animals that are useful to man, it may harm people and communities--esthetically, economically, and emotionally--and it may threaten human health. Thus, since the legal implications are apparent, forensic scientists must become actively involved in the science of human environmental quality.</p> <p>In the long-term view, legislation is the only means of making significant advances in the protection and reclamation of man's natural resources. But legislation takes time, and time is running out. Hence the American Trial Lawyer's Association takes the view that the common law is the device that can be used immediately. For example, there is the theory of "nuisance liability" under which a</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 3 PAGE 19</p>
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THE DRAFT UNITED NATIONS CONVENTIONS ON THE INTERNATIONAL SEABED AREA: BACKGROUND, DESCRIPTION, AND SOME PRELIMINARY THOUGHTS

Knight, H. Gary (Louisiana State University Law Center, Baton Rouge, La.)  
San Diego Law Review 8, No. 3, 459-550 (May 1971)

This paper raises certain issues involved in the concepts embodied in the Draft Convention [Draft U.N. Convention of the International Seabed Area: U.S. Working Paper Submitted to U.N. Seabeds Committee, 63 Department of State Bulletin 209 (1970)] and indicates why the document is a good one for the Nation, the international community, and the offshore mining industry. One part of the paper deals with background material relevant to aspects of marine geology and marine resources law, a short history of the seabed question from August 1967 to date, the genesis and substance of the Nixon statement of May 23, 1970 [Nixon, United States Policy for the Seabed, 9 International Legal Materials 807 (1970), 62 Department of State Bulletin 737 (1970)], and the Draft Convention. Another part of the article summarizes the salient provisions of the Draft Convention and makes some preliminary analytical comments concerning several of the provisions. The final part contains a brief resume of national, international, and industry interests served by the document. [240 footnotes]

FORECASTING SCIENTIFIC AND TECHNICAL PROGRESS

Kurakov, I. G.  
Edited machine trans. of Voprosy Filosofii (USSR) 22, No. 10, 21-35 (1968) by Bernard L. Tauber.  
Report No. FTD-MT-24-234-70, 31 pp. (January 29, 1971) (Foreign Technology Div., Wright-Patterson AFB, Ohio) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-726 589, PC\$3.00; MF\$0.95.  
Government Research Announcements 71, No. 17, 28 (September 10, 1971)

The article seeks to analyze the relation between an increase in the level of industrial knowledge and an increase in the productivity of labor. By means of formulas and graphs, it attempts to determine that portion of the increase in production funds which should be expended on the improvement of industrial knowledge. Comparisons with similar expenditures in non-communist countries are made. The ultimate goal is the development of an analytical tool for forecasting industrial growth. (Author)  
Reprinted

AN INTERNATIONAL REGIME FOR THE DEEP SEABED: DEVELOPING LAW OR DEVELOPING ANARCHY?

Pardo, Arvid (Permanent Representative of Malta to the United Nations)  
Texas International Law Forum 5, No. 2, 204-217 (Winter 1969)

The author believes that the establishment of an effective international regime for the seabed and ocean floor beyond national jurisdiction is the only way to avoid the apparently inevitable danger that will arise if the present uncertain status of the seabed continues. He states that there are now no legal norms nor are there indications of any developing international consensus that can effectively restrict the extension of national jurisdiction over the seabed beyond the geophysical Continental Shelf. Three basic, interconnected questions must be answered if a legal regime based on the common interests of man is to be established. These are: (1) What are the outer limits of the Continental Shelf subject to the sovereignty of the coastal state for the purpose of exploration and exploitation of its natural resources? (2) What legal concept and principles should be applied to the area of the seabed beyond the legal Continental Shelf? (3) What are the nature and the implications for states of the legal regime that should be adopted for the seabed beyond natural jurisdiction? The author discusses the general framework within which these answers may be sought. [10 footnotes]

(9.19)

Ege, Karl J.  
Cornell Law Review 56, No. 5, 847-863 (May 1971)

ENFORCING ENVIRONMENTAL POLICY: THE ENVIRONMENTAL OMBUDSMAN

The author proposes the creation of an Office of Environmental Ombudsman in the legislative branch of government as a significant step towards an effective program of environmental administration. The Council on Environmental Quality would assist and advise the President through investigation, review, and appraisal of programs of the federal government; the Environmental Protection Agency would provide operating control of its standard-setting and enforcement programs; and the Environmental Ombudsman would conduct investigations (on his own initiative or upon request of private citizens or members of Congress) to ensure agency compliance with the National Environmental Policy Act. [76 footnotes]

The author discusses the principles of international law employed in delimiting bays from territorial waters and the high seas. [80 footnotes]

North Carolina Law Review 49, Special Issue, 943-963 (August 1971)

INTERNATIONAL LAW AND THE DELIMITATION OF BAYS

Yates, George Talmadge, III (School of Law, University of Virginia, Charlottesville, Va. 22903)

Juergensmeyer, Julian Conrad (Tulane University, New Orleans, La.)  
University of Florida Law Review 23, No. 3, 439-450 (Spring 1971)

Part 1 of this comment explores the original purpose of the fishing provision of the treaties [10] concluded by the Federal Government with Indian tribes of the Northwest. [The treaties ... assured each tribe the right to fish outside its reservation at all "usual and accustomed" places.] Further, this part discusses the current congressional concern over its [treaty fishing provision] enforcement and the Supreme Court's response to state reluctance to recognize the fishing rights secured by the provision. Part 2 explores the relationship between the state governments and the Indian treaty fishermen. In the final part, Part 3, the author analyzes the problems of judicial posture inherent in administering the fairest solution to the fishing rights problem.

[222 footnotes]

FTP

9.19 DETERGENT SITUATION IN ENVIRONMENTAL HYGIENE  
Tomiyama, Shinichi, and Kenkichi Oba (Iion Fat and Oil Co., Yokosumi, Sumida-ku, Tokyo, Japan)  
Journal of Japan Oil Chemists' Society 20, No. 1, 46-56 (January 1971)

$$.3(9.16)(9.19)$$

### 9.3 THE UN AND THE LAW OF THE SEA: PROSPECTS FOR THE UNITED STATES SEABEDS TREATY

Cummings, J. C. (Food and Drug Administration, Division of Food Chemistry and Technology, Rockville, Md.)

January 1969. Available from the National Technical Information Services, Operations Division, Springfield, Va. 22151. Order No. AD-726 028. PC\$3.00; MF\$0.95.

Government Research Announcements 71, No. 16, 51 (August 25, 1971)

ducks, geese, turkeys, chickens, and other poultry, meat, fish and shellfish and potable water are also required for each registered use. (Author) Reprinted

FILL

This note was prepared by the student author and was delivered at the Southern Regional meeting of the American Society of International Law at the University of North Carolina on February 27, 1971. The article discusses the United States' approaches to maritime jurisdiction over fishery resources and the domestic policy regarding maritime jurisdiction.

Davis, Gilbert Thomas (University of North Carolina)  
Vanderbilt International 4, No. 2, 109-119 (Spring 1971)

Wulf, Norman A. (International Law Division, Office of the Judge Advocate General of the Navy)

# FREEZING THE BOUNDARY DIVIDING FEDERAL AND STATE INTERESTS IN OFFSHORE SUBMERGED LANDS

### 9.3 MARITIME JURISDICTION OVER FISHERY RESOURCES



9.3 VIENNA CONVENTION ON THE LAW OF TREATIES TRANSMITTED TO THE SENATE

Anonymous  
Department of State Bulletin 65, No. 1694, 684-689 (December 13, 1971)

Reprinted here are the texts of President Richard Nixon's message to the Senate of the United States transmitting, for the advice and consent of the Senate to ratification, the Vienna Convention on the Law of Treaties signed for the United States on April 24, 1970. Also reprinted is Secretary of State William P. Rogers's report to the President. The Convention sets forth a generally agreed body of rules to govern all aspects of treaty making and treaty observance. The Convention consists of eight parts; procedures for handling most important disputes are contained in the Annex. Secretary Roger's report gives the major provisions of the Convention. [2 footnotes]

9.4 NATIONAL MARINE FISHERIES SERVICE FEDERAL AID PROGRAM ACTIVITIES 1971

Anonymous  
NOAA, National Marine Fisheries Service, Division of Federal Aid Staff, Washington, D.C., 138 pp. (July 1971). Order No. COM-71-00942. Available from the National Technical Information Service, U.S. Department of Commerce, Sills Bldg., Springfield, Va. 22151.  
NOAA Publications Announcement No. 71-77, 8, Item 71-17-16-16 (October 1971)

This is the fourth of a series of annual publications on the Federal Aid Program of the National Marine Fisheries Service (formerly Bureau of Commercial Fisheries). This report is intended to provide State program coordinators and administrators, Federal people, project personnel, and others concerned with research, development, conservation, and management of our fishery resources with a convenient reference to the National Marine Fisheries Service grant-in-aid program. This publication will also facilitate planning, coordination, and integration of State, Federal, and other activities concerned with the fishery resources. (Author text, extract by SK)

Reprinted

9.6 FURTHER STUDIES OF ALASKA SOCKEYE SALMON (1.32, 9.12)

Burgner, Robert L. (ed.)  
Further Studies of Alaska Sockeye Salmon, v + 267 pp., illus. (University of Washington: Seattle [1968]). \$3.60 paper.  
Reviewed by John W. Emig  
California Fish and Game 55, No. 3, 255-256 (July 1969)

Six reports that are essentially separate entities constitute this second volume of a series devoted to work done by the University of Washington's Fisheries Research Institute. Their titles are as follows:

"A Comparison of the Food of Sockeye Salmon Fry and Threespine Sticklebacks in the Wood River Lakes,"

"Distribution and Growth of Sockeye Salmon Fry in Lake Aleknagik, Alaska, During the Summer of 1962,"

"Identification of Adult Sockeye Salmon Groups in the Chignik River System by Lacustrine Scale Measurement, Time of Entry, and Time and Location of Spawning,"

"On the Use of Otoliths of Sockeye Salmon for Age Determination,"

"Physical Environment and Egg Development in a Mainland Beach Area and an Island Beach Area of Iliamna Lake,"

(over)

9.6 AQUATIC SCIENCES & FISHERIES ABSTRACTS

Akyüz, E. F. (Fishery Resources Division, FAO) (editor in chief)  
Food and Agricultural Organization of the United Nations, Rome, Italy

This new abstract journal is compiled by FAO with the collaboration of the Institut für Dokumentationswesen, Frankfurt; Bundesforschungsanstalt für Fischerei, Hamburg; INRA, Département d'Hydrobiologie, Biarritz; and Information Retrieval Limited, London. Each month some 1,200 abstracts (drawn from 1,500 primary aquatic science journals and 1,500 fringe journals containing articles that concern living aquatic resources in their environment and methods of research applicable to these resources) will be published. Articles on fishing craft, gear, and methods, and on primary fishing industries generally, will be included if their content relates to appraisal and use of the resources. The abstracts will be in English, the original title plus the English translation being given for non-English papers, and will be arranged in broad subject categories (see the back of the card). Author, geographic, and taxonomic (alphabetical) indexes will be compiled monthly, and subject indexes at least annually. Since the journal is entirely computer oriented, all data will be computer retrievable. Zentralstelle für Maschinelle Dokumentation, in Frankfurt, is developing a completely mechanized storage and retrieval system that is planned to go into operation in 1973.

Volume 1 of Aquatic Sciences & Fisheries Abstracts covers the period from July to December 1971; it costs \$77.50. Volume 2 will cover the period from January to December 1972; it costs \$175.00. Orders should be sent to Circulation Manager, Information Retrieval Ltd., 38 Chancery Lane, London WC2A 1EL, England.

Subject categories for the arrangement of abstracts are as follows:

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Jolliff, James V. (Commander, U.S. Navy)  
Naval Engineers Journal 83, No. 5, 61-75 (October 1971) (American Society of Naval Engineers, Inc., 1012 Fourteenth St., N.W., Washington, D.C. 20005)

The goals of the ocean engineer are:

1. The scientific study of the world ocean.
2. The development of basic technology for furthering man's extension into the ocean technologies.
3. Specific task accomplishments (e.g. recovering ocean minerals, countering corrosion, ...)
4. Utilizing the ocean and its resources for purposes of desalinization, mineral extraction, recreational park development, aquaculture, advanced commercial fishery development, ....

[11 figures, 11 references]

FTP

Reymond, Dominique (Physical, Chemical, and Mathematical Services, Research Laboratories, Nestle Products Technical Assistance Co., Ltd., Vevey, Switzerland)  
Food Technology 25, No. 11, 78-80, 82 (November 1971)

Variations in processing techniques can cause variations in flavor quality (distribution and content of flavor components) in foodstuffs. Enrichment techniques (cold trapping, steam distillation under reduced pressure, and solvent extraction) can be used to concentrate volatile flavor components and these components can be analyzed by such analytical techniques as ultraviolet absorption spectroscopy and gas chromatography. The author describes how these techniques can be used in the processing of milk, coffee, tea, cocoa butter, tomato puree, and frozen peas in order to assure optimum quality of these foods.

FTP

Pariser, E. R. (Department of Nutrition and Food Science and the Education Research Center, Massachusetts Institute of Technology, Cambridge, Mass. 02139)  
Food Technology 25, No. 11, 88-90, 92, 94-96, 98, 100 (November 1971)

The author discusses the United States' approach to the use of aquatic sources of protein in contrast to the approach of other countries.  
[6 illustrations, 33 references]

FTP

Ishio, S., T. Yano, and H. Nakagawa (Department of Fisheries Chemistry, Kyushu University, Fukuoka-shi, Fukuoka-ken, Japan)  
Presented at the 5th International Water Pollution Research Conference, July-August 1970, III-18/1 to III-18/8

In Contributions From the Department of Fisheries and the Fishery Research Laboratory, Kyushu University, No. 16 (1970)

Porphyra tenera, a favorite food of the Japanese, is cultivated extensively in the coastal waters of Kyushu Island. However, it will not grow in waters near the mouth of the Ohmura, which discharges wastes from the coal chemical industry. Algae as far as 4 km. from the mouth exhibit the same cancerous condition as that induced by X-ray irradiation or by exposure to water containing such carcinogenic compounds as nitrogen mustard. In this study, the authors identify the substances that cause cancer in the alga exposed to waters from the Ohmura.

Carcinogenic compounds were extracted with acetone from the bottom mud of the waters polluted by wastes from the coal chemical industry. The extracts were separated into bases, acids, and neutrals, the most intensively carcinogenic being the last. These neutral fractions gave two carcinogenic compounds; one was ben-zanthrone and the other a new hydrocarbon with the molecular formula C<sub>25</sub>H<sub>14</sub>. All leaves of P. tenera exposed to 0.2 p.p.m. benzanthrone at 10° C. developed cancer within 40 days. The origin of both compounds was traced to a certain synthetic process at a dye factory.

[7 figures, 1 table, 13 references]

LB

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Heighway, Arthur J.	15	9.16	Orehovich, V. N.	1	0.38	Ueyama, Hideo	3	0.5			
Hickey, Frank David	6	2.3	Orlov, Yu. N.	8	3.2386	Umemori-Aikawa, Yoko	4	0.5			
Himel, Chester M.	2	0.35	Owen, T. G.	15	9.13		2	0.38			
Huslin, Stanley C. (pat.)	16	9.16									



## COMMERCIAL FISHERIES ABSTRACTS

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# Commercial Fisheries Abstracts

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National Oceanic and Atmospheric Administration  
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*10/17/72*

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VOLUME 25

NUMBER 4

Seattle, Wash.



# UNITED STATES DEPARTMENT OF COMMERCE

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Frank T. Piskur  
Editor



0.35 IMMUNOCHEMISTRY OF SPERM WHALE MYOGLOBIN. X. REGIONS RESPONSIBLE FOR IMMUNOCHEMICAL CROSS-REACTION WITH FINBACK WHALE MYOGLOBIN. SOME GENERAL CONCLUSIONS CONCERNING IMMUNOCHEMICAL CROSS-REACTION PROTEINS

Atassi, M. Z., and B. J. Saplin (Department of Chemistry, Wayne State University, Detroit, MI 48202)  
Biochemistry 10, No. 25, 4740-4747 (December 7, 1971)

The authors report on detailed studies on the immunochemical cross-reaction of finback whale myoglobin with antisera to sperm whale myoglobin and of sperm whale myoglobin with antisera to finback whale myoglobin.  
[3 figures, 9 tables, 28 references]

FTP

-----  
FTP of the hemoproteins." [3 figures, 2 tables, 55 references]

0.35 STEREOCHEMISTRY OF HEMES AND OTHER METALLOPORPHYRINS  
Hoard, J. L. (Cornell University, Ithaca, NY 14850)  
Science 174, No. 4016, 1295-1302 (December 24, 1971)

This article is a review of the stereochemistry of hemes and other metallo-

porphyrins. The author concludes that the "metalloporphyrins, most notably the

iron porphyrins observe clearly defined, internally consistent, structural prin-

ciples that promise to be fully applicable to the hemes in the several families

of the hemoproteins." [3 figures, 2 tables, 55 references]

FTP

0.36 METABOLIC EVIDENCE AGAINST THE ROLE OF 2-ACYL GLYCEROLS IN THE BIOSYNTHESIS OF 1-ALKYL-2,3-DIACYL GLYCEROLS IN MARINE FISH

Malins, D. C., and P. A. Robisch (Pioneer Research Laboratory, National Marine Fisheries Service, NOAA, 2725 Montlake Blvd. East, Seattle, WA 98102 U.S.A.)  
Biochimica et Biophysica Acta, Lipids and Lipid Metabolism 248, No. 3, 430-433 (December 14, 1971)

In order to determine the possible precursor role of 2-acyl glycerols in lipid biosynthesis, the researchers examined (1) the molecular structures of the 1-alkyl-2,3-diacyl glycerols in the liver of dogfish (*Squalus acanthias*) and (2) the uptake of radioactivity into acyl positions 2 and 3 after administration of [<sup>14</sup>C]palmitic acid *in vivo*. The authors indicate that the molecular structures of 1-alkyl-2,3-diacyl glycerols from the liver of dogfish reveal an accumulation of C<sub>20</sub> and C<sub>22</sub> polyenoic acids on position 2 that is characteristic of marine glycerolipids; the presence of these acids on position 2 may imply biosynthesis from exogenous 2-acyl glycerols. However, the present data on incorporation of radioactivity from [<sup>14</sup>C]palmitic acid revealed extensive metabolism of acyl groups on position 2 and argues against such a pathway. Moreover, a small degree of biosynthesis of 1-alkyl-2,3-diacyl glycerols from a discrete pool of 1-acyl-2-snongonoxe of 1-alkyl-2,3-diacyl glycerols from a discrete pool of 1-acyl-2-snongonoxe cannot be excluded.  
[2 tables, 15 references]

FTP

0.38 ENZYMATIC DEGRADATION OF WHALE CARTILAGE KERATOSULFATE  
(0.5)(0.34)  
(1.953)

Kitamikado, Manabu, Ryuji Ueno, and Takashi Nakamura (Laboratory of Fishery Technology, Faculty of Agriculture, Kyushu University, Fukuoka, Japan)  
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 6, 592-596 (June 1970), and No. 11, 1172-1180 (November 1970)

In Contributions From the Department of Fisheries and the Fishery Research Laboratory, Kyushu University, No. 16 (1970)

In 1953, Meyer et al. found a mucopolysaccharide composed of N-acetylglucosamine, galactose, and sulfate in bovine cornea. They named it keratosulfate. In 1961, Seno found keratosulfate (KS) in whale nasal cartilage, and Furuhashi found it in elasmobranch cartilage. The present authors attempt to find a bacterium that will degrade KS and to obtain a KS-degrading enzyme from the culture fluid of the bacterial strain. Such an enzyme would be useful in investigations of the detailed structure not only of whale KS but of various connective tissues.

I. Isolation of a Keratosulfate-Degrading Bacterium; pp. 592-596.

The procedures used and problems encountered in isolating one species of bacterium that would exhibit appreciable KS-degrading activity are discussed. A bacterium isolated from human stools was inoculated in heart infusion broth containing 0.3% whale cartilage KS and incubated at 37° C. It consumed almost all the KS within 2 days.

[1 figure, 1 table, 18 references]

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 4 PAGE 1

0.38 [ISOZYMES OF ASPARTATE AMINOTRANSFERASE IN THE SKELETAL MUSCLE OF CARP]  
ISOZYME DER ASPARTAT-AMINOTRANSFERASE IN DER SKELETMUSKULATUR DES KARPENS

Masic, Djurdjica, and Reiner Hamm (Institut für Chemie und Physik der Bundesanstalt für Fleischforschung, Kulmbach, Germany)  
Archiv für Fischereiwissenschaft 22, No. 2, 110-120 (October 1971) (In German)

The total aspartate aminotransferase (glutamate oxaloacetic transaminase, GOT) activity of white carp muscle is of the same magnitude as that of porcine *M. longissimus dorsi*. Red carp muscle showed higher GOT activity than did white carp muscle. Four GOT isozymes were found (after electrophoretic separation) in the extract of light carp muscle. One isozyme was found in the sarcoplasma; the other three, in the mitochondrial fraction.  
[2 figures, 3 tables, 34 references]

FTP

0.2 OXIDATIONS BY MOLECULAR OXYGEN  
(4.21)

Anantkrishnan, Sekharipuram V., and H. Jayaraman (Dep. Chem., Madras Christian Coll., Madras, India)  
Chemical Abstracts 74, No. 13, 63599a (March 29, 1971)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 4 PAGE 1

POLYCHLORINATED BIPHENYLS (PCB):  
EFFECT ON MITOCHONDRIAL ENZYME SYSTEMS

0.4

Pardini, Ronald S. (Division of Biochemistry, University of Nevada, Reno, NV 89507) Bulletin of Environmental Contamination and Toxicology 6, No. 6, 539-545 (November-December 1971)

The effect of eight various PCB samples on heavy beef heart mitochondria NADH-oxidase and succinoxidase enzyme systems was determined. The data indicate that all the PCBs tested inhibit the NADH-oxidase system and the succinoxidase system. [3 tables, 18 references]

FTP

[5 figures, 2 references]

FTP

The Institute of Animal Physiology and the Fire Research Station collaborated in the development of a wooden laboratory cupboard for the fire protection of solvents. The cupboard is intended to protect its contents for a short time so as to minimize the size of the fire to be controlled and to allow the staff to escape. [5 figures, 2 references]

Chemistry and Industry No. 42, 1193-1195 (October 16, 1971)

WOODEN LABORATORY CUPBOARDS FOR THE FIRE PROTECTION OF SOLVENTS

0.110

(56.1)(46.0)(5.0) 86.0

II. Identification of a Keratosulfate-Degrading Bacterium; pp. 1172-1174.

The KS-degrading bacterium was identified as *Escherichia freundii*, a species of common enteric bacteria. Its morphological, cultural, and biochemical characteristics are tabulated. [2 tables, 3 references]

III. Purification of a Bacterial Keratosulfate-Degrading Enzyme; pp. 1175-1180. [Reported by Kitamikado and Ueno only]

The adaptive enzyme, capable of hydrolyzing glycosidic bonds in KS, produced by *Escherichia freundii* was purified by ammonium sulfate fractionation, Sephadex filtration, DEAE-cellulose chromatography, CM-cellulose chromatography, and CM-cellulose rechromatography. The specific activity of the electrophoretically homogeneous final preparation was about 1,750 times as much as that of the original culture fluid. [3 figures, 1 table, 6 references]

BT

Chemical Abstracts 75, No. 19, 117281g (November 8, 1971)

QUALITY OF THUNNUS ALBACARES. CHEMICAL EVALUATION

0.38

Aldrin, J. F., and A. Grandjeard (Lab. Dir. Peches Marit. Lagunaires, Abidjan, Ivory Coast)

STUDIES ON COLLAGENASE OF A MARINE BACTERIUM. PART I.  
THE ISOLATION AND DETERMINATION OF MICROORGANISM PRODUCING COLLAGENASE

0.38 (0.5)

Hanada, Kazunori, Taku Mizutani, Michio Yamagishi, Masaharu Tamai, Hikoji Tsuji, Tetsuo Misaki, and Jiro Sawada (Research Laboratory, Taisho Pharmaceutical Co., Ltd., No. 34-1, Takata 3-chome, Toshimaku, Tokyo, Japan)

Agricultural and Biological Chemistry 35, No. 11, 1651-1659 (November 1971)

In this study the researchers were looking for a marine bacterium that could produce, extracellularly, collagenase under aerobic conditions. They isolated such a bacterium, strain 7-2476-6, from sea water that produced an extracellular enzyme specific for native collagen and gelatin. The strain was similar to *Pseudomonas aeruginosa*, morphologically and physiologically except that it differed slightly from *P. aeruginosa* in the following aspects: the presence of granular structure on the plate culture, the optimum growth temperature, the presence of granular structure (as determined by granular staining), the utilization of carbohydrates, and the number of flagella. [5 figures, 8 tables, 27 references]

FTP

Chemical Abstracts 74, No. 25, 137095g (June 21, 1971)

ELECTROPHORETIC HETEROGENEITY OF SERUM PROTEINS  
IN CARTILAGINOUS, GANOID AND TELEOST FISH

0.321 (9.125)

Luk'yanenko, V. I., and A. V. Popov (Cent. Res. Inst. Sturgeon Ind., Astrakhan, U.S.S.R.)

CARBONIC ANHYDRASE INTERACTION WITH DDT, DDE, AND DIELDRIN

0.38 (6.1)

Pocker, Y., W. M. Beug, and V. R. Vinardi (Department of Chemistry, University of Washington, Seattle, WA 98105) Science 174, No. 4016, 1336-1339 (December 22, 1971)

Carbonic anhydrase (CA) catalyzes the reversible hydration of the reaction:



It is found in animals, in plants, and in some bacteria. In the present study, the authors examined the effects of DDT, its stable metabolite DDE, and dieldrin on carbonic anhydrase.

They conclude that DDT, DDE, and dieldrin are not true inhibitors of CA action (as is currently believed). These pesticides have the ability, when added in excess of their solubility limit, to occlude small amounts of CA from solution during the course of crystal formation. The amounts of CA occluded depend on the conformational and topographical characteristics of the particular molecules. [3 figures, 1 table, 1 reference]

FTP



0.6	SYMPOSIUM: OILSEED PROCESSORS CHALLENGED BY WORLD PROTEIN NEED (Authors and subjects listed below) Journal of the American Oil Chemists' Society 48, No. 9, 473-498 (September 1971)  The symposium was presented at the ISF-AOCS Congress, Chicago, Ill., September 1970. Articles of interest to fishery technologists are: "Marketing Considerations for Improved Protein Food Products," by A. N. Meiss and S. M. Cantor (Sidney M. Cantor Associates, Inc., Haverford, Pa. 19041), pp. 473-476. Improved protein foods must be classless and must be introduced simultaneously at all levels of society if they are to be effective and accepted by the target consumers. Successful market development of improved protein food products in less developed countries requires a systems approach in which interrelationships among food availabilities, nutritional needs, acceptability factors, and purchasing power are evaluated in the context of the total food system of the country. [9 references] "The Functional Requirements for Foods," by Karl F. Mattil (Texas A&M University, College Station, Tex. 77843), pp. 477-480. The author gives examples of the influence of the ionic environment of one basic functional property of proteins, their solubility in aqueous solutions. [5 figures, 5 references] "Textured and Shaped Oilseed Protein Food Products," by M. D. Wilding (Research and Development Center, Swift and Co., Oak Brook, Ill. 60521), pp. 489-491. This paper briefly discusses the production, functional aspects, and nutritional aspects of textured and shaped oilseed proteins. [4 figures, 1 table, 8 references]	COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 4 PAGE 3 (over)
0.7	EFFECTS OF LYSINE ON DOUGH AND PROTEIN QUALITY OF WHOLE WHEAT MEAL CHAPATIS AND LEAVENED BREAD (6.54)  Tara, K. Alasingrachar, M. Srinivasa Murthy Usha, and G. Singh Bains (Central Food Technological Research Institute, Mysore-2A, India) Journal of Agricultural and Food Chemistry 20, No. 1, 116-118 (January-February 1972)  In certain developing countries, the bulk of wheat is used as wheat meal (atta). The atta is used chiefly in unleavened pancakes (chapatis). The present authors felt that there was a great potential for the use of fortified whole wheat meal yeast bread in such countries. Therefore, they studied the effects of lysine on the dough properties of whole wheat meal and losses in baking in relation to the quality of protein in chapatis and yeast bread. The farinograph water absorption dough development time and stability of whole wheat meal (atta) were not affected by the incorporation of L-lysine monohydrochloride at levels of 0.1-0.4%. Chapatis made of fortified whole wheat meal containing 0.15% L-lysine monohydrochloride, showed a negligible loss of lysine; chapatis made of fortified whole wheat meal containing 0.20% L-lysine monohydrochloride showed a loss of 12.5% of the lysine content. The protein efficiency ratios (PER) of fortified chapatis and of bread (2.04 and 2.21, respectively) were significantly higher than those of similar products prepared from unfortified whole wheat meal (1.48 and 1.36, respectively). [1 figure, 2 tables, 14 references]	COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 4 PAGE 3 FTP

0.5	MICROBIOLOGICAL CHANGES IN PREPACKED COD FILLETS IN RELATION TO THE OXYGEN PERMEABILITY OF THE FILM (2.43)  Debevere, J. M., and J. P. Voets (Department of General and Industrial Microbiology, Faculty of Agricultural Sciences, University of Ghent, Coupure 533, Ghent, Belgium) Journal of Applied Bacteriology 34, No. 3, 507-513 (September 1971)  The researchers examined the effects of oxygen permeability of different polyethylene films and storage temperatures on the deterioration of cod filets and the relation of these parameters to the formation of total volatile basic nitrogen, trimethylamine nitrogen, and formalin bound nitrogen and to the growth of total aerobic microflora and of spoilage organisms. The objective was to establish standards to which a film must conform in order to be proposed for the packaging of fish. A polyvinyl chloride film and a laminate composed of regenerated cellulose and polyethylene were used. Films of thickness of 20, 30, 40, 50, and 100 $\mu$ m were used having nominal oxygen permeability of, respectively, 3,600, 2,100, 1,800, 1,500, and 50 ml. of $O_2/m^2/24$ hr. Storage temperatures were 0°, 3°, and 6° C. The spoilage of the packaged cod filets is not related to oxygen permeability of the film. The deterioration curves for the filets stored at 3° and 6° C. were the same as that for the filets stored at 0° C. Apparently, a film with approximately 3,600 ml./m <sup>2</sup> /24 hr. oxygen permeability gives the best results. [5 figures, 3 tables, 7 references]	COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 4 PAGE 3
0.5	AN IMPROVED MEDIUM FOR DETECTION OF CLOSTRIDIUM BOTULINUM TYPE E  Lilly, T., Jr., S. M. Harmon, D. A. Kauter, H. M. Solomon, and R. K. Lynt, Jr. (Food and Drug Administration, U.S. Department of Health, Education, and Welfare, Washington, DC 20204) Journal of Milk and Food Technology 34, No. 10, 492-497 (October 1971)  This enrichment medium (TPGYT) for detection of Clostridium botulinum type E contains trypticase, peptone, glucose, yeast extract, and 1 mg. of trypsin/ml. It was designed to potentiate toxin (by trypsin) as produced and to destroy the boticins (rapidly destroyed by proteolytic enzymes) of competing type E variants in cultures of food and environmental materials. This paper is a summary of data collected on the use of the medium to detect the type E organisms in 283 samples of various shellfish products and 227 samples of sediments. The 510 samples yielded 214 positive cultures of type E (126 from the sediments and 86 from the shellfish samples) using the TPGYT medium (containing trypsin); this total number of positives was approximately four times the number of positives obtained in the same medium (TPGY) free of trypsin. Using TPGYT, type E toxin was detected in all smoked fish that had been inoculated with 4 to 100 type E spores per fish. Incorporating trypsin into TPGY caused no reduction in type A or proteolytic type B toxin production from spore inocula. Also, toxins of nonproteolytic types B and F in pure culture were fully potentiated in the TPGYT (trypsin-containing) medium. [7 tables, 22 references]	COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 4 PAGE 3 FTP

ENVIRONMENTAL NITROSO COMPOUNDS: REACTION OF NITRITE WITH CREATINE AND CREATININE (0.7)

Archer, Michael C., Stephen D. Clark, Joan E. Thilly, and Steven R. Tannenbaum (Department of Nutrition and Food Science, Massachusetts Institute of Food Technology, Cambridge, MA 02139) Science 174, 174, 1343 (December 24, 1971)

The authors investigated the mutual reactivity of nitrite, creatine, and creatinine. These compounds are abundant in the environment and are frequently ingested simultaneously in a normal diet. It is possible, the authors state, that nitrosamines will form in the environment whenever nitrite and secondary and tertiary amines occur together.

Under acidic conditions, creatine reacts with nitrite to produce first sarcosine then N-nitrososarcosine (a weak carcinogen in the rat). Creatinine reacts with acidified nitrite to produce either creatinine-5-oxime or 1-methylhydantoin-5-oxime depending upon the conditions of the reaction. The toxicity of these compounds is not known. [2 figures, 2 references]

Formula feedings based on isolated soy protein are as effective as cow's milk in the rehabilitation of malnourished infants. Abstract reprinted

Anonymous Nutrition Reviews 29, No. 11, 245-246 (November 1971)

SOY PROTEIN QUALITY

The authors determined the odor threshold for a series of unsaturated ketones, secondary alcohols, and substituted furans when the compounds were added to bland edible oil. [2 references]

The authors determined the odor threshold for a series of unsaturated ketones, secondary alcohols, and substituted furans when the compounds were added to bland edible oil. [2 references]

The authors attempted to determine the mode of lethal action of ethylene oxide on spores of *Clostridium botulinum* 62A. Death of spores of the organism, when they were exposed to gaseous ethylene oxide, followed first order kinetics. It appears that the lethal action of ethylene oxide on the spores of *C. botulinum* is through alkylation of both guanosine triphosphate and adenosine triphosphate of DNA (deoxyribonucleic acid). [5 figures, 24 references]

TEMPERATURE CYCLING EFFECTS ON BACTERIAL GROWTH. PSEUDOMONAS FLUORESCENS (0.5)

Howell, J. J., R. L. Saffle, and J. J. Powers (Department of Food Science, University of Georgia, Athens, GA 30601) Journal of Food Science 36, No. 5, 778-780 (July-August 1971)

The purpose of this study was to determine the effect of mild cycling of temperature on the growth of *Pseudomonas fluorescens*. A thermal gradient-bar, similar in design to the one developed by C. H. Oppenheimer and W. Drost-Hansen [Journal of Bacteriology 80, 12, 1961] was used. The effect of mild cycling of temperature on the growth of the organism seemed to depend upon whether the temperature was above or below the optimum temperature for growth. Growth response of the organism was greater when the temperatures were cycled down than when the temperatures were cycled up.

The authors found that *Trichoderma koningi* is capable of degrading one or more of the carbons on the chlorinated ring of the dieldrin molecule. [1 figure, 1 table, 9 references]

Trichoderma koningi is capable of degrading one or more of the carbons on the chlorinated ring of the dieldrin molecule. [1 figure, 1 table, 9 references]

The authors found that *Trichoderma koningi* is capable of degrading one or more of the carbons on the chlorinated ring of the dieldrin molecule. [1 figure, 1 table, 9 references]

DEGRADATION OF DIELDRIN TO CARBON DIOXIDE BY A SOIL FUNGUS (0.5)

Bixby, M. W., G. M. Boush, and F. Matsumura (Department of Entomology, University of Wisconsin, Madison, WI 53706) Bulletin of Environmental Contamination and Toxicology 5, No. 6, 491-494 (November-December 1971)

The authors found that *Trichoderma koningi* is capable of degrading one or more of the carbons on the chlorinated ring of the dieldrin molecule. [1 figure, 1 table, 9 references]

The authors found that *Trichoderma koningi* is capable of degrading one or more of the carbons on the chlorinated ring of the dieldrin molecule. [1 figure, 1 table, 9 references]

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The authors found that *Trichoderma koningi* is capable of degrading one or more of the carbons on the chlorinated ring of the dieldrin molecule. [1 figure, 1 table, 9 references]



McKinney, Ross E. (University of Kansas, Lawrence, Kans. 66044), E. C. McGriff (Mississippi State University, State College, Miss. 39762), R. J. Sherwood (Envirotech Corp.), V. N. Wahbeh and D. W. Newport (Black and Veatch) Water and Wastes Engineering 8, No. 9, 51, 52, 64 (September 1971)

This article is a review of background information on the use of activated algae to treat domestic sewage. Work on the process is being done at the University of Kansas and the University of Mississippi. Key to this new waste treatment system is the application of basic concepts of microbial flocculation to the use of algae. [2 figures, 6 references]

FTP

# 1.017 SEAFOOD REPORT NOW AVAILABLE

Anonymous

Australian Fisheries 30, No. 10, 10 (October 1971)

The report entitled "Seafood Processing" by the Department of Trade and Industry of Australia is now on sale for \$2.24 (in Australia) and \$2.25 (overseas).

It covers information on the structure, capacity, production, distribution and trade of the industry with a view to examining industry problems and assessing future prospects. Copies can be obtained from the Australian Government Publishing Service, P.O. Box 84, Canberra, A.C.T.

Bogdanov, A. S. (editor)

Pishcheyeva Promyshlennost (1965) (Moscow). Translation available from the National Technical Information Service, U.S. Department of Commerce, Sills Bldg. Springfield, Va. 22151. Order No. TT 69-59016.

NOAA Publications Announcement No. 71-77, 8, Item 71-17-16-20 (October 1971)

In September 1962 the governments of the USSR and Cuba concluded an agreement on sea fishing, which opened up new horizons and possibilities for development of fishing and scientific fishery investigations in the western part of the Atlantic Ocean, especially in tropical and subtropical regions. Investigations were carried out on modern Soviet fishery research vessels equipped with the latest scientific instruments and fishing gear. Fishery science, which assists the industry in solving technical problems, must first study the condition of the resources of commercial marine fish, patterns of their distribution, biology, and features of their behavior related to their environment. Investigations were carried out simultaneously on organization and techniques of fishing, increasing the storage period of caught fish, mechanization of processing, and optimal utilization of the raw material for food and for manufactured products. The result of the investigations is summarized in this collection of papers by Soviet and Cuban scientists. (SK)

Reprinted

Anonymous (Report edited by the staff of the Marine Biology and Engineering Branch, Fisheries Resources Division, FAO, Rome, Italy) FAO, Fisheries Reports, No. 71-2, 347 pp. (September 1971)

This report contains the full texts (in their original language) of the papers contributed to the Fisheries Resources Section of the Symposium on Investigations and Resources of the Caribbean Sea and Adjacent Seas. The symposium was organized jointly by UNESCO and FAO and cosponsored by WMO and was held in Willemstad, Curaçao, from 18 to 26 November 1968. The symposium was carried out in preparation for the Cooperative Investigations in the Caribbean and Adjacent Regions started in 1970 under the auspices of the Intergovernmental Oceanographic Commission.

FTP

This circular contains hydrographic information on the important waterways of Africa. Data for the report was obtained from various FAO publications and from 23 other reference sources. [Contains 6 maps]

Welcome, Robin L. (Inland Fishery Resources Branch, Fishery Resources Division, Department of Fisheries, FAO, Rome, Italy)

FAO Fisheries Circular No. 134, 38 pp. (December 1971) (Distribution restricted)

FAO, Rome, Italy)

## PRELIMINARY LIST OF THE INLAND WATERS OF AFRICA AND THEIR CHARACTERISTICS

1.016 COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 5

Henry, Kenneth A. (NOAA, National Marine Fisheries Service, Biological Laboratory, Seattle, Wash. 98102)

NOAA Technical Report NMFS SSRF-642, 32 pp. (August 1971) Order No. COM-71-50357, (National Technical Information Service, U.S. Department of Commerce, Sills Building, Springfield, Va. 22151)

NOAA Publications Announcement No. 71-77, 5, Item 71-17-16-04, (October 1971)

After record catches in 1961 and 1962 of about 2.3 billion pounds (1.043 million metric tons) of menhaden (*Brevoortia* spp.), the U.S. catch declined to about 1.2 billion pounds (0.544 million metric tons) in 1967. Most of the decrease was in the North Atlantic and Middle Atlantic. Since about 1940, catches had increased, in general, with increased fishing effort. In recent years, however, the catch per unit of effort (a standard vessel day) has declined markedly. It fell from about 148,000 pounds (67.1 metric tons) in 1962 to about 38,000 pounds (17.2 metric tons) in 1967 in the North Atlantic and from 140,000 pounds (63.5 metric tons) in 1962 to 51,000 pounds (23.1 metric tons) in 1967 in the Middle Atlantic. The catch per unit of effort in these two areas improved in 1968, but fishing effort was at such a low level that the increase is of doubtful significance. (Author abstract, mod. by WT)

Reprinted



0.9 DESIGN AND SYNTHESIS OF CONTROLLED RELEASE PESTICIDE-POLYMER COMBINATIONS (9.19)

Allan, G. G., C. S. Chopra, A. N. Neogi, and R. M. Wilkins (College of Forest Resources, University of Washington, Seattle, WA 98105) Nature 234, No. 5328, 349-351 (December 10, 1971)

Use of persistent pesticides is undesirable because they may be frequently incorporated into the food chain. On the other hand, use of pesticides with short lives tends to be ineffective. Both types of pesticides are often applied in amounts grossly in excess of that actually required to control the pest to compensate for the loss of pesticide by leaching and evaporation. The present workers examined the potential of pesticide-polymer combinations for securing controlled release of a biodegradable pesticide in the correct amount needed over an appropriate period of time. Such controlled pesticide release systems are currently being tested for forestry applications. In the present article, the authors discuss two approaches: (1) pesticide release by diffusion through polymers and (2) pesticide release by degradation of a polymer containing the pesticide as a pendant side chain.

For approach (1) the active pesticide is dissolved or encapsulated in a polymeric matrix and the combination is placed in the medium where pesticidal activity is desired. Release of pesticide occurs by diffusion. For approach (2), the pesticides, exemplified by the herbicidal phenoxyacetic acids (RCOOH), are chemically attached as a pendant substituent to a natural or synthetic water-soluble or insoluble polymer having a replaceable hydrogen as formulated in the equation:



[3 figures, 16 references] TTP

8.0 PORT AND HARBOR DEVELOPMENT SYSTEM. PHASE 1 - DESIGN GUIDELINES WORK REPORT

Prepared by the staff of the Architecture Research Center, College of Architecture and Environmental Design, Texas A&M University, College Station, TX 77843 Report TAMU-SG-7L-216, 140 pp. (August 1971)

This report is intended to aid those who are involved in and responsible for port and harbor planning and design. The various sections of the report include: (1) an analysis of present harbor design features (types, location, administration, transportation, cargo handling, labor, support industry, safety, finance); (2) a step-by-step description of the requirements in port design and construction (decision, preliminary, site investigation, general review, harbor and channel, breakwaters, terminal, offshore structures, buildings, dock types, dry docks, piles, tender systems, moles, trestles, and catwalks); (3) a description of important trends in marine transportation and technology; and suggestions for planning and design concepts for ports in different stages of development. [11 figures, 11 references]

[5 papers] TTP

0.5 VARIATION IN THE BACTERIAL FLORA IN CHILL STORED SEA WATER

Tajima, Kenichi, Yoshio Ezura, and Minoru Sakai (Laboratory of Microbiology, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)

Bulletin of the Faculty of Fisheries Hokkaido University 22, No. 1, 80-90 (May 1971) (In Japanese)

[1 figure, 8 tables, 11 references]

1.86 (9.14)(9.16)

EFFECTS OF TEMPERATURE AND SALINITY ON GROWTH, FOOD CONVERSION, SURVIVAL AND TEMPERATURE RESISTANCE OF JUVENILE BLUE CRABS, CALLINectes SAPIDUS RATHBUN

Holland, J. S., D. V. Aldrich, and Kirk Strawn (Department of Wildlife and Fisheries Sciences, Texas A&M University) Sea Grant Publication TAMU-SG-7L-222, xii + 166 pp. (August 1971) (Texas A&M University Sea Grant Program and the Moody Foundation, Galveston, Tex.)

Rees (1967) ranks the blue crab [*Callinectes sapidus* Rathbun] as economically the third most important marine organism of Chesapeake Bay, the South Atlantic coast and the Gulf of Mexico, outranked only by the shrimp, *Penaeus* sp., and oyster, *Crassostrea virginica*. Although large populations of blue crabs exist along the Atlantic and Gulf coasts of the United States, annual fluctuations in abundance create many problems for the fishing and packing industries dependent upon these populations.

A possible solution to the fluctuation of abundance of natural populations of blue crabs and a means of alleviating the thermal loading of estuaries lies in pond culture. By heating culture ponds with thermally-loaded water, two beneficial results could be realized. First, blue crabs could be kept at temperatures at which they could grow during periods when natural water temperatures would prevent their growth. Second, culture ponds could serve as retention basins to lower the temperature of heated water before it is returned to the estuary.

The general objective of this study is to supply information vital to the commercial culture of the blue crab on the Texas Gulf Coast.

From authors' introduction [36 figures, 32 tables, 84 references]

THE SHRIMP LEPTALPHEUS FORCEPS IN OLD TAMPA BAY, FLORIDA (9.12)(9.17)

Saloman, Carl H. (NOAA, National Marine Fisheries Service, Biological Laboratory, St. Petersburg Beach, Fla.)

Quarterly Journal of the Florida Academy of Sciences 34, No. 1, 1-7 (March 1971) NOAA Publications announcement No. 71-17-77, 9, Item 71-17-16-23 (October 1971)

The alpheid shrimp, *Leptalpheus forceps* Williams, was collected in Old Tampa Bay, Fla., during studies of benthic invertebrates. This marked the first collection of the species outside the type locality, Beaufort, N.C. It was reported there by Williams as a commensal in burrows of the macruran crustacean, *Upogebia affinis*. The purpose of this report is to document occurrence of the shrimp in Old Tampa Bay, describe the collection site, and record certain ecological conditions in the habitat. These features include sediment type and hydrological conditions within the burrows and from surrounding water. Abundance, size, and reproductive state are also recorded. (Author) Reprinted

The author comments on the proposed names [R. H. Payne, A. R. Child, and A. Forrest, Nature 231, 250 (1971)] of the European subspecies of the Atlantic salmon *Salmo salar* of "europaeus" and "americanus." He indicates that the European subspecies of the Atlantic salmon should be called *Salmo salar salar* Linnaeus.

TTP

SALMON NOMENCLATURE

Grunby, C. G. (Ichthyology Unit, Natural Museum of Natural Sciences, Ottawa K1A0M8, Ontario, Canada) Nature 234, No. 5328, 360 (December 10, 1971)



2.01 BIOCHEMICAL CHANGES IN SHRIMP INOCULATED WITH PSEUDOMONAS,  
(0.5) BACILLUS AND A CORYNEFORM BACTERIUM

Cobb, B. F., III, and C. Vanderzant (Animal Science Department, Texas A&M University, College Station, TX 77843)  
Journal of Milk and Food Technology 34, No. 11, 533-540 (November 1971)

In this paper, the authors describe the biochemical and organoleptic changes that take place in shrimp inoculated with species of Pseudomonas, Bacillus, and a coryneform bacterium. The biochemical parameters examined were: volatile nitrogen, volatile acid, volatile reducing substances, total volatile nitrogen, trimethylamine nitrogen, nonprotein nitrogen, water-soluble proteins, salt-soluble proteins, free amino acids, and size and shape of proteins as measured by Sephadex chromatography. The shrimp (Panaeus setiferus) were prepared as follows: They were headed and peeled aseptically. The shrimp meats were rinsed in tap water, washed with ethanol, then washed with sterile de-ionized distilled water. Sterile "shrimp juice" was also prepared. Test samples consisted of control (not inoculated) shrimp, inoculated shrimp, control (not inoculated) shrimp juice, and inoculated shrimp juice. Test samples were stored at 5° C.

Samples of shrimp inoculated with species of Pseudomonas became spoiled 2 to 3 days earlier than did the controls (noninoculated samples); those inoculated with species of coryneform bacteria showed delayed spoilage; and those inoculated with species of Bacillus spoiled about the same time as did the controls. The (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 7

2.115 [A TREATISE TO THE PROBLEM OF HULL VIBRATIONS OF FISHING VESSELS  
AS A NOISE SOURCE IN REGARD TO FRIGHTENING OF FISH]  
BEITRAG ZUM PROBLEM DES SCHEUCHENS VON FISCHEN DURCH  
SCHIFFSSCHWINGUNGEN ALS GERÄUSCHQUELLE

Karger, W. (Institut für Fangtechnik der Bundesforschungsanstalt für Fischerei, Hamburg, Germany)  
Archiv für Fischereiwissenschaft 22, No. 2, 155-164 (October 1971) (In German)

The author made measurements of the vibrations aboard 11 fishing cutters, each of which had different hull and engine concepts. He wanted to find out whether it would be possible to reduce the level of noise radiated from fishing vessels. In spite of differences in construction of the 11 cutters, the intensities of sound radiating from them was of about the same level. The author concludes that damping of noise in fishing vessels is not economically possible now, and that it might be more rational to increase trawling speed so as to reduce the possibility of fish escaping the net.

[13 figures, 2 tables, 3 references]

FTP

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This is a fluke-type, marine mooring anchor that can be quickly converted from a folded restrained position to an open, working condition.

FTP

Official Gazette of the U.S. Patent Office 892, No. 2, 523 (November 9, 1971)  
U.S. Patent 3,618,554  
Patten, Lowell Lloyd (pat.)

2.114 BOAT- OR SHIP-TYPE ANCHOR

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 7

2.1471 THE SHRIMP-FISH SEPARATOR TRAWL: PRELIMINARY OBSERVATIONS  
ON ITS INTRODUCTION INTO THE OREGON FISHERY

Jurkovich, Jerry E. (NOAA, National Marine Fisheries Service, Exploratory Fishing and Gear Research Base, Seattle, WA 98102)  
Proceedings of the National Shellfisheries Association 61, 8 (June 1971)  
NOAA Publications Announcement No. 72-4, (72-04-16-01) 3 (February 1972)

Since 1967 we have been developing trawls that will separate ocean pink shrimp (Pandalus jordani) from fish and debris in the net while it is being towed over the ocean floor. Sorter trawls offer several advantages over conventional shrimp trawls; by allowing unwanted fish and debris to pass through the net, sorter trawls reduce laborious sorting of catches by hand aboard the vessel. They also conserve fish that otherwise would be discarded dead after sorting aboard the vessel and improve the quality of shrimp by eliminating crushing that normally occurs from large quantities of fish in the net when it is lifted aboard. Preliminary reports from fishermen using sorter trawls after the season opened in March 1970 indicated the trawls effectively sorted fish and debris but that they did not yield as large catches of shrimp as conventional shrimp trawls. Examination of weighed-out-weights and fishing logs, however, showed that boats using sorter trawls produced as much shrimp as vessels with conventional trawls. As a consequence, more captains of Pacific Northwest shrimp vessels are now converting their nets to sorter trawls.

(Author's abstract in part)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 7

2.3 WEIGHT LOSS OF POND-RAISED CHANNEL CATFISH (ICTALURUS PUNCTATUS)  
(9.16) DURING HOLDING IN PROCESSING PLANT VATS

Greenland, Donald C., and Robert L. Gill (National Marine Fisheries Service, NOAA, P.O. Box 711, Rohwer, AR 71666)  
NOAA Technical Report NMFS SSRF-648, 7 pp. (December 1971) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price \$0.25.

Most of the catfish processing plants located in Alabama, Arkansas, and Mississippi utilize live fish delivered to their plants to insure a high-quality finished product. These catfish are held in large concrete vats at the plants. As needed, fish are removed from the vats, killed, and run directly onto the processing line. Processors have often mentioned to us that the weight of fish being held for processing "shrinks" from pond-side weighings and that weight deductions for scrap fish and removal of dead catfish account for only a portion of the difference. These weight discrepancies have caused misunderstandings between farmers and processors. Without accurate "shrink" data, processors have been reluctant to consider changing plant facilities to try to reduce weight loss. Our assistance was requested to obtain data that would be helpful to processing plant managers in deciding whether fish weight losses were indeed a problem. During the winter of 1970-71, a study to determine this was conducted at the Southern Catfish Processors, Inc. in Dumas, Ark., by National Marine Fisheries Service personnel.

Some conclusions were as follows:

1. Channel catfish lose weight during holding. Most of the loss occurs during the first 48 hr and the test results showed 82.0% of the maximum average weight loss of 55 kg per metric ton (5.5 lb. per cwt) occurred during this period.

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 7





2.8 (0.5) DESTRUCTION OF SALMONELLAE BY MICROWAVE HEATING OF FISH WITH IMPLICATIONS FOR FISH PRODUCTS

Baldwin, Ruth E., M. L. Fields, William C. Poon, and Bernice Korschgen (Department of Food Science and Nutrition, University of Missouri, Columbia, MO 65201) Journal of Milk and Food Technology 34, No. 10, 467-470 (October 1971)

This work consisted of the examination of the adequacy of microwave heating for destruction of salmonellae inoculated on the surface of fish. Also, the time and temperature relationships during microwave heating of certain fish products were determined in order to evaluate the effectiveness of this process for the destruction of salmonellae in certain prepared fishery food products.

Exposure of 270 g. pieces of carp to microwaves (2450 MHz) for 195 sec. was not adequate to completely destroy all the *Salmonella typhimurium* ATCC 6994 or the *S. typhimurium* ATCC 13311 inoculated on the surface of the pieces of fish.

One-serving size portions of tuna pies, tuna casseroles, fish fillets, and fish sticks required from 49 sec. to 390 sec. to reach the temperature of 55° C. (The lethal temperature for the salmonellae) when heated by microwaves. (Under normal use of microwave ranges, one-serving size portions would not be heated for as long as 390 sec.)

[2 figures, 1 table, 13 references] FTP

3.11 EFFECT OF EDTA ON THE GERMINATION OF AND OUTGROWTH FROM SPORES OF *CLOSTRIDIUM BOTULINUM* 62-A

Winarno, F. G., C. R. Stumbo, and K. M. Hayes (Department of Food Science and Technology, University of Massachusetts, Amherst, MA 01002) Journal of Food Science 36, No. 5, 781-785 (July-August 1971)

Most low-acid canned foods are heat processed sufficiently to free them of spores of the botulinum organisms. However, certain food items, for various reasons (e.g. quality), cannot be given the severe heat treatment sufficient to eliminate the heat resistant spores of types A and B. Such products must be refrigerated or must be treated with bacterial inhibitors. The purpose of the present study was to determine the effect of EDTA, ethylenediaminetetraacetic acid, (a bacterial inhibitor) on the germination of and the outgrowth from spores of *Clostridium botulinum* type A. For these tests, pork infusion agar, polypeptone agar, and polypeptone broth were chosen as representative media for optimal growth of the organism; fish flesh (homogenized) was chosen as representative of low-acid food products.

Germination of and outgrowth from spores of *C. botulinum* type A and production of toxin was inhibited in a fish homogenate containing 5.0 (or above) mM of EDTA per liter of fish homogenate (1 part fish flesh and 2 parts distilled water). The inhibitory action of EDTA was influenced by the pH of the medium in the range of pH 6.5 to 8.1; the inhibitory action increased with increasing pH values within the range. The inhibitory effect of EDTA was also influenced by the cation content

(over)

3.249 (9.16) STORAGE STABILITY OF COMMERCIALLY PREPARED AND FROZEN POND-RAISED CHANNEL CATFISH (*ICTALURUS PUNCTATUS*, RAPINISQUE)

Boggess, T. S., Jr., E. K. Heaton, and A. L. Shewfelt (University of Georgia, College of Agriculture Experiment Stations, Georgia Station, Experiment, GA 30212) Journal of Food Science 36, No. 7, 969-973 (November-December 1971)

The purpose of this study was to determine the storage quality of samples of frozen pond-raised channel catfish from five commercial processing plants. Three distinct types of processing treatment were involved in the five sets of samples. The samples were stored at a temperature no higher than -10° F.; they were examined at regular intervals during the storage period of 270 days. The tests and examinations consisted of: moisture content, pH, fat stability (TBA value), shear press values of the raw fish, and sensory ratings for appearance, aroma, color, texture, and flavor of the cooked samples.

The storage behavior of the frozen pond-raised channel catfish is influenced substantially by the characteristics of the fresh fish, and by the practices used in handling and processing the product. Fish samples that were skinned and samples that were slow frozen showed increased moisture loss on frozen storage. The rates of decrease in quality were caused in part by variations in the methods of skinning and freezing. Certain developments in the aroma and flavor of the catfish were attributed to the conditions of the ponds during the production of the fish. [7 tables, 18 references] FTP

3.238 (2.43) (9.19) PLASTIC PACKAGES AND THE ENVIRONMENT

Thomka, L. M. (Packaging Department, Dow Chemical Co., Midland, MI 48604) Journal of Milk and Food Technology 34, No. 10, 485-491 (October 1971)

The author states that, contrary to popular belief and current publicity, most plastics do make good packaging material when evaluated relative to their disposability and environmental effects. Thermoplastics are remeltable and can be recycled by existing methods to other plastic products. Furthermore, because they consist of mainly carbon and hydrogen and have a high energy content, thermoplastics are especially suitable for disposal in municipal incinerators for drying trash and generating power. They are not biodegradable, but they do degrade when exposed to outdoor weathering, and they are suitable and stable landfill materials. The foregoing benefits along with consumer appeal, sanitary nature, light weight, and protection afforded by plastics must all be considered when evaluating packaging materials. [8 figures, 14 references] FTP

The author describes, briefly, the use of certain polyphosphate products in the curing of meats.

Gordon, A. Food Manufacture 46, No. 10, 63-64 (October 1971)

3.12 POLYPHOSPHATES IN PROCESSING OF CURED MEATS

### 3.3 A CONDENSED HISTORY OF THE SCIENCE AND TECHNOLOGY OF THERMAL PROCESSING--PART 1

Goldblith, Samuel A. (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Food Technology 25, No. 12, 44-46, 48-50 (1256-1258, 1260-1262) (December 1971)

This article is a history of the development of canning in terms of science and technology, relating the developments to the social fabric of our times.  
[3 figures, 28 references]

FTP

FTP  
[4 figures]

This is the first article of three devoted to the retorting process. The author discusses briefly the operations that take place during steam processing and during hot water processing. Three graphs are given showing the cooking retort temperature versus the pressure cycle (1) when the steam valve is too large, (2) when there is inefficient venting and early opening of the cooling water valve, and (3) when the correct cooking cycle is used for a typical retort.

3.33 RETORTING PROCEDURES  
(0.8)

Hughes, P. (Taylor Instrument Companies (Europe) Ltd.)  
Food Manufacture 46, No. 11, 23-24, 26 (November 1971)

3.2499 [INFLUENCE OF FREEZING AND THAWING OF CARP ON THE SUBCELLULAR DISTRIBUTION OF ASPARTATE AMINOTRANSFERASE IN THE SKELETAL MUSCLE]  
(0.38)(8)(7.9)  
EINFLUSS DES GEFRIERENS UND AUFTANENS VON KARPEN AUF DIE SUBZELLULÄRE VERTEILUNG DER ASPARTAT-AMINOTRANSFERASE IM SKELETMUSKEL

Hamm, Reiner, and Djurdjica Masic (Institut für Chemie und Physik der Bundesanstalt für Fleischforschung, Kulmbach, Germany)  
Archiv für Fischereiwissenschaft 22, No. 2, 121-129 (October 1971) (In German)

Light carp muscle, excised immediately post mortem, results in damage of muscle mitochondria (caused by a high rate of breakdown of adenosine triphosphate). The authors reached this conclusion on the basis of some release of the mitochondrial isozymes of aspartate aminotransferase (glutamic-oxalacetic transaminase, GOT) into the sarcoplasm (muscle press-juice) and from the determination of ATP and its metabolites. Whole fish stored at 4° C. for 48 hr. post mortem showed only a little release of mitochondrial GOT.

Light carp muscle frozen at -20° C. and thawed and light carp muscle held in frozen storage for 3 months do not show any remarkable change in total GOT activity of the tissue. However, light carp muscle held in frozen storage for 6 months shows a large drop in total GOT activity. The muscle press-juice from frozen and thawed carp muscle shows a considerable increase in total GOT activity. The authors state that this effect is caused by a partial release of the three mitochondrial isozymes from the mitochondrial membranes into the sarcoplasm. Freezing causes damage to mitochondria. The authors proposed a routine test for differentiating between nonfrozen and frozen and thawed fish.

[3 figures, 9 tables, 6 references]

FTP

of the medium; equimolar concentrations of added CaCl<sub>2</sub> or MgCl<sub>2</sub> completely cancelled the inhibitory action of EDTA. Also, the higher the spore concentration in the medium, the higher the concentration of EDTA required for inhibition. No evidence was found that EDTA, in any concentration used, promoted spore germination.  
[4 figures, 5 tables, 8 references]

FTP

Courtial, Wolfgang (Farbwerke Hoechst A.-G.)  
German Offen. (Patent) 1,914,639 (Nov. 12, 1970)  
Chemical Abstracts 75, No. 7, 47656g (August 16, 1971)

3.12 ON THE PRESERVING EFFECT OF SODIUM FORMATE  
Scheer, H. (Institut für Biochemie und Technologie der Bundesforschungsanstalt für Fischerei, Hamburg, Germany)  
Archiv für Fischereiwissenschaft 22, No. 1, 79-84 (June 1971)

Sodium formate was ineffective as a preservative of cod tissue and German caviar. [5 tables]

FTP

PRESERVATION OF FISH FILLET

PACKAGES AND PACKAGING MATERIAL FOR FISH

(38)(2)  
47.2

Organization for Economic Cooperation and Development Publication No. 27,233, 95 pp.  
Anonymous  
Paris 16<sup>e</sup>, France  
World Fisheries Abstracts 22, No. 3, 42, No. 3, 42 (July-September 1971) (1971)

This booklet is a review of the situation of the fish packaging industry in Western Europe relative to the different types of containers and packages used for the handling, transport, and distribution of fish. It is divided into 9 parts: (1) Returnable fish boxes, (2) Nonreturnable fish boxes, (3) Prepackaged wet fish, (4) Packaging of frozen fish, (5) Fish packaging materials, (6) Properties of plastic films used in fish packaging, (7) Properties of plastic films used in fish packaging, (8) Properties of plastic films used in fish packaging, (9) Properties of plastic films used in fish packaging.

(Abstract in WFA monograph by FTP)

3.11 FISH PASTE  
(6.54)  
Chiyodakagakukogyosho K.K. (pat.)  
Japanese Patent 17938/71  
Food Technology 25, No. 11, 118 (November 1971)

Fish paste products are treated with bromate, chlorate, or persulfate salts.

FTP



#### REVIEW [LIPIDS]

Authors as listed below

Journal of the Japan Oil Chemists' Society 20, No. 10, 2-151 [612-761] (October 1971) (In Japanese)

Card A

This issue of the Journal is a review of the various aspects of the chemistry and biochemistry of lipids. The various articles are listed below.

"Separation and Identification of Lipids," by Tarō Hori and Osamu Itaskak (Department of Chemistry, Shiga University, Ishiyama-Hirazu, Otsu, Shiga-ken, Japan) pp. 2-16 [612-626]. [18 figures, 8 tables, 66 references]

"Biosynthesis of Lipid," by Yasuhiko Fujino (Department of Agricultural Chemistry, Obihiro Chikusan University, Inada-cho, Obihiro, Hokkaido, Japan) pp. 17-26. [627-636]. [15 figures, 13 references]

"Absorption and Transport of Fat," by Yasuo Akanuma (The Third Department of Internal Medicine, University of Tokyo 7-3-1, Hongo, Bunkyo-ku, Tokyo, Japan) pp. 27-31 [637-641] [3 figures, 1 table, 25 references]

"Lipids and Hormones," by Masami Nakamura (The Third Department of Internal Medicine) pp. 32-40 [642-650]. [7 figures, 1 table, 82 references]

"Lipids and Membrane Structure," by Osamu Hirayama (College of Agriculture, Shimane University, 1060 Nishikawatsu-cho, Matsue-shi, Japan) pp. 41-47 [651-657]. [7 figures, 1 table, 55 references]

"Immunology of Lipids," by Ichirō Hara (Tokyo Medical and Dental University, Kojimachi, Ichikawa, Japan) pp. 48-52 [658-662]. [15 references]

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 11

#### REVIEW [LIPIDS]

Authors as listed below

Journal of the Japan Oil Chemists' Society 20, No. 10, 2-151 [612-761] (October 1971) (In Japanese)

Card B

"Blood Lipids," by Tamotsu Taketomi (Institute of Adaptation Medicine, Shinshu University, Matsumoto-shi, Nagano-ken, Japan) pp. 127-134 [737-744]. [7 figures, 9 tables, 33 references]

"Lipids of Brain and Nerve," by Kōhei Hayashi (School of Medicine, Gunma University, Showa-machi, Maebashi-shi, Japan) pp. 135-151 [745-754]. [11 figures, 2 tables, 79 references]

"Liver Lipids," by Toshio Sakagami (Sapporo Medical College, South 1, West 17, Sapporo, Japan) pp. 151-171 [755-761]. [19 figures, 5 tables, 11 references]

FTP

Chemical Abstracts 75, No. 9, 62331r (August 30, 1971)

#### ACID COMPOSITION OF THE NONOXIDIZED FRACTION SEPARATED FROM OXIDIZED OIL

4.21

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 11

#### DIFFERENCES IN THE FATTY ACID COMPOSITIONS OF BLUBBER FATS FROM NORTHWESTERN ATLANTIC FINWHALES (BALAENOPTERA PHYSALUS) AND HARP SEALS (PAGOPHILUS GROENLANDICA)

4.14

Ackman, R. G., S. Epstein, and C. A. Eaton (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia, Canada)

Comparative Biochemistry and Physiology 40, No. 3B, 683-697 (November 15, 1971)

Whales (Cetacea) and seals (Pinnipedia) deposit subcutaneous fat layers which act as insulation and depot fat, and probably have other functions such as reducing the resistance of the animal to the flow of water during swimming. In an attempt to discriminate between dietary and other factors affecting fatty acid compositions of blubber fats of these mammals, the authors examined the fatty acid composition of oil extracted from the blubber of one finwhale, of three commercial finwhale oils, and of three commercial harp seal oils.

The difference in composition of the saturated fatty acids among the fats were not significant, but the proportion of saturated fatty acids in the whale oil was higher than that in seal oils.

The results confirmed that 16:1 > 16:0 is typical of seal blubber; furthermore, details of isomers showed that the 16:1 ω<sup>7</sup> is extended to 18:1 ω<sup>7</sup> and 20:1 ω<sup>7</sup>, and suggested that 18:1 ω<sup>9</sup> is extended to 20:1 ω<sup>9</sup>.

The authors propose that the seals, but not the whales, degrade a substantial part of ingested fatty acids to resynthesize 16:1.

[4 tables, 56 references]

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 11

#### EFFECT OF HEME COMPOUNDS ON LIPID OXIDATION

4.30

Hirano, Y., and H. S. Olcott (Department of Nutritional Sciences, Institute of Marine Resources, University of California, Berkeley, Calif. 94720)

Journal of the American Oil Chemists' Society 48, No. 10, 523-524 (October 1971)

The authors used a polarographic oxygen analyzer to study the effect of heme compounds on oxidation rates of linoleate emulsion systems. They found that the rate of oxidation of linoleate solutions was catalyzed by low concentrations of heme and heme-proteins and inhibited by higher concentrations. Also, high concentrations of these compounds inhibited lipooxygenase catalysis of linoleate oxidation. Salts of manganese and cobalt inhibited heme-catalyzed linoleate oxidation. The authors state that these combined effects may reflect the oxidative synthesis of antioxidants from heme compounds.

[5 figures, 7 references]

FTP

[3 figures, 6 tables, 25 references]

Ogawa, Akira, Koichi Zama, and Hisanao Igarashi (Laboratory of Food Chemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)

Bulletin of the Faculty of Fisheries Hokkaido University 22, No. 2, 159-167 (August 1971) (In Japanese)

#### CONJUGATED LIPIDS OF THE RED SALMON KIDNEY (LIPIDS OF SALMONOID FISHERIES XI)

4.13

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 11

## OXIDATIONS INVOLVING THE HEME COMPLEX IN RAW MEAT

4.5  
(0.03)

Greene, Barbara E. (School of Home Economics, University of Georgia, Athens, Ga. 30601)

Journal of the American Oil Chemists' Society 48, No. 11, 637-639 (November 1971)

Heme pigments can catalyze oxidation of tissue lipids causing a stale or rancid flavor and odor. Free radicals from lipid oxidation can oxidize and decompose the red ferrous hemes resulting in brown colored meat. In this article, the author discusses three approaches in the study of means of reducing these nonmicrobial oxidative changes: (1) (1) enzymatic reduction of metmyoglobin to maintain ferrous pigments, (2) inhibition of pigment and lipid oxidation and decomposition by means of an antioxidant and reducing agent, and (3) the use of model systems to study the kinetics of lipid and heme oxidations.

[1 figure, 1 table, 15 references]

FTP

[8 figures, 3 tables, 18 references]

The authors propose the use of a chick embryo test for the evaluation of the toxicity of rancid oils. Using this test, they found that various fresh oils were nontoxic to chick embryos but rancid oils were toxic--the toxicity increased with higher degrees of rancidity of the oils. The abstract and the wording of the tables and figures of this article are in English, but the body of the report and most of the references are in Japanese.

Journal of Japan Oil Chemists' Society 20, No. 6, 13-18 [335-340] (June 1971)

Miura, Toshiyuki, Masako Tsuchida, and Kōmei Miyaki (National Institute of Health, Kamiosaki, Shinagawa-ku, Tokyo, Japan)

## TOXICOLOGICAL EXAMINATION BY CHICKEN EMBRYO ON RANCID OILS

4.92

THE BOTTLE-NOSED DOLPHIN MILK TRIGLYCERIDES  
FATTY ACID COMPOSITION

4.5  
(0.03)

Ackman, R. G., C. A. Eaton (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada), and E. D. Mitchell (Fisheries Research Board of Canada, Arctic Biological Station, Ste. Anne de Bellevue, Quebec, Canada)

Canadian Journal of Biochemistry 49, No. 10, 1671-1677 (1971)

The triglycerides of the milk of the bottle-nosed dolphin correspond in fatty acid details to the composition of the depot fats of marine mammals generally.

[1 table, 1 figure, 15 references]

## LIPID OXIDATION AND OXIDIZED OIL STAIN OF AQUATIC PRODUCTS

4.21

Toyomizu, Masamichi (Fac. Agr., Kyushu Univ., Fukuoka, Japan)

Chemical Abstracts 73, No. 23, 119249k (December 7, 1970)

## LIPID OXIDATION AND OXIDIZED OIL STAIN OF AQUATIC PRODUCTS

4.21

## MONOETHYLENIC FATTY ACIDS OF A PARTIALLY HYDROGENATED HERRING OIL

4.13

Ackman, R. G., S. N. Hooper, and J. Hingley (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia, Canada)

Journal of the American Oil Chemists' Society 48, No. 2, 804-806 (December 1971)

In Canada, hydrogenated marine oils have been used in margarines, shortenings, or cooking oils. Recent work has demonstrated certain physiological responses of animals to long chain C20 and C22 monoethylenic fatty acids [J. E. Beare-Rogers, E. A. Nera, and H. A. Heggveit, Can. Inst. Food Technol. J. 4, 120 (1971)]. The present article reports on the analysis of a partially hydrogenated herring oil used in a similar study [H. Brockerhoff and P. H. Odense, Fish. Res. Bd. Canada, Tech. Rept. No. 229 (1970) and P. H. Odense and H. Brockerhoff, J. Fish. Res. Bd. Canada, in press].

The herring oil used in these tests had been hydrogenated for margarine use to an iodine value of 76 and a melting point of 32.5° C. The hydrogenated herring oil had 30% saturated acids and 66% monounsaturated fatty acids. The trans acids were 33% of the C16 and C18 monounsaturated acids, 32% of the C20 monounsaturated acids, and 28% of the C22 monounsaturated acids. The positions of the double bonds of the original cis fatty acids were largely retained in both cis and trans isomers, but, the authors indicate, additional isomers were observed, especially in the trans fatty acids.

FTP

[1 table, 20 references]

"Biochemistry of Branched Chain Fatty Acids," by Nobuo Ueta (Department of Biochemistry, University of Tokyo) pp. 53-59 [663-669]. [5 figures, 35 references]

"Desaturation and Chain-Elongation of Fatty Acids--Especially in Relation to the Nutritional Type of Organism and the Environmental Factors--," by Sūichi Kimura (Department of Food Chemistry, Faculty of Agriculture, Tohoku University, 1-1, Tsutsumi-dori-aramiya-machi, Sendai, Japan) pp. 60-67 [670-677]. [4 figures, 56 references]

"Bacterial Lipids," by Makoto Matsumoto and Masao Miwa (Shizuoka College of Pharmacy, 2-2-1 Oshika, Shizuoka-shi, Japan) pp. 68-76 [678-684]. [1 figure, 105 references]

"The Lipids of Yeasts," by Hiroshi Kaneko and Toshihiro Itoh (School of General Studies, Kitasato University, 1. Asamizodai, Sagami-hara-shi, Kanagawa-ken, Japan) pp. 77-84 [687-694]. [6 figures, 3 tables, 79 references]

"Plant Lipids," by Masayuki Katayama (Department of Agricultural Chemistry, University of Osaka Prefecture, Sakai, Osaka, Japan) pp. 85-95 [695-707]. [4 figures, 11 tables, 101 references]

"Lipids of Seeds," by Manjirō Noda (College of Agriculture, Kyoto Prefectural University, Sakyo-ku, Kyoto, Japan) pp. 96-101 [708-714]. [1 figure, 4 tables, 62 references]

"The Lipids of Fish and Plankton," by Minoru Yamada (Faculty of Fisheries, Hokkaido University, Minato-machi, Hakodate, Japan) pp. 101-107 [715-721]. [4 tables, 63 references]

"Lipids of Shellfish," by Akira Hayashi (Faculty of Science and Technology, Kinki University 321, Kowakae, Higashiosaka, Osaka, Japan) pp. 108-114 [722-728]. [6 figures, 9 tables, 169 references]

[Continued on Card B]



# THE INFLUENCE OF PARTIALLY DELACTOSED WHEY, FISH MEAL AND SUPPLEMENTAL BIOTIN IN BROILER DIETS

Dannon, B. L., D. P. Eberst, and R. H. Harms (Florida Agricultural Experiment Station, Gainesville, FL 32601)  
Poultry Science 50, No. 6, 1768-1771 (November 1971)

The purpose of this study was to determine the influence of partially delactosed whey, fish meal, and supplemental biotin, alone and in combination, on the growth and feed efficiency of broilers. The addition of either 3.0% fish meal, 1.5 or 3.0% partially delactosed whey, or 100 and 200 mg./ton of supplemental biotin to a commercial-type broiler diet did not result in a significant response from the broilers as measured by body weight or feed efficiency. However, when 100 or 200 mg./ton of biotin or 1.5 or 3.0% of whey were added to a diet containing the other material a significant growth response was indicated when the birds reached 4 weeks of age. [3 tables, 14 references]

FTP

Shimma, Yaichiro, and Hisako Shimma (Freshwater Fish. Res. Lab., Tokyo, Japan)  
Chemical Abstracts 75, No. 5, 34206k (August 2, 1971)

## LIPIDS EXTRACTED FROM IMPORTED BROWN FISH MEAL

6.190  
(4.20)

# [DEVELOPMENT OF NEW FISH PROTEIN CONCENTRATES IN ARGENTINA. I. CHEMICAL BASIC COMPOSITION] ENTWICKLUNG NEUER FISCHMEHLE IN ARGENTINIEN. I. CHEMISCHE GRUNDZUSAMMENSETZUNG

Sotorres, Atilio M., Niels A. Suldstrup, and Elsa L. Itten de Entizne (Química Biológica, Departamento de Química e Ing. Química, Universidad Nacional del Sur, Bahía Blanca, Argentina)  
Archiv für Fischereiwissenschaft 22, No. 2, 130-135 (October 1971) (In German)

The proximate composition and amino-acid content of several fish protein concentrates (prepared from various fishes caught near Bahía Blanca, Argentina) are given in this article. The basic composition and amino-acid content of the protein concentrates were similar. The authors considered the various fish protein concentrates suitable for human consumption.  
[3 tables, 12 references]

FTP

Makdani, Dhiraajlal D. (Michigan State Univ., East Lansing, Mich.)  
Chemical Abstracts 75, No. 15, 96081z (October 11, 1971)

## NUTRITIVE VALUE OF FISH PROTEIN CONCENTRATE

6.54

# FRACTIONATION OF GOLDFISH BRAIN AMINOACYL-TRANSFER RNA AT THE MICROGRAM LEVEL

Kaplan, B. B., V. De León, and J. J. Sirlin (Department of Anatomy, Cornell University Medical College, New York, N.Y. 10021)  
Journal of Neurochemistry 18, No. 6, 845-850 (June 1971) (Pergamon Press, Maxwell House, Fairview Park, Elmsford, N.Y. 10523)

The authors describe a simple, reproducible, chromatographic system that can be used to rapidly scan tRNAs extracted from limited amounts of biological material. It is a modified, scaled-down (by a factor of 100) version of the methylated albumin-kieselguhr column first used by Sueoka and Yamane (1962) to fractionate tRNA. With it, the authors were able to separate 1 µg. of tRNA from goldfish brain; and by double labeling co-chromatography they were able to characterize isoaccepting tRNAs without serious loss of resolution. Although they have not tried to fractionate less than 1 µg. of radioactive aminoacylated tRNA, they state that further scaling down seems to be feasible.  
[4 figures, 23 references]

LB

Myhrman, Rolf, and Joyce Bruner-Lorand (Dep. Chem., Northwest Univ., Evanston, Ill.)  
Chemical Abstracts 75, No. 11, 71604j (September 13, 1971)

## LOBSTER MUSCLE TRANSEPTIDASE

7.591

# METHOD OF DETERMINING CAROTENOID CONTENTS OF ALASKA PINK SHRIMP AND REPRESENTATIVE VALUES FOR SEVERAL SHRIMP PRODUCTS

Kelley, Carolyn E., and Anthony W. Harmon (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Kodiak, AK 99615)  
Fishery Bulletin 70, No. 1, 111-113 (January 1972)

The carotenoid in Alaska pink shrimp is primarily astaxanthin. The content of carotenoid in Alaska pink shrimp varies with the season of the year and with the different areas in which the shrimp are caught. The carotenoid content may correlate with the quality of the shrimp and as such may be useful as an index of quality.

The method of analysis described in this article measures total astaxanthin and its oxidation product astacin. The method is a modification of the one developed by Elinor Ravesi in 1965 (Unpublished manuscript filed at the present authors' laboratory in Kodiak). The original method had to be modified because shrimp meat contains more interfering protein and moisture than does crab meat. The modified method for determining carotenoid content of Alaska pink shrimp is simple and precise and may be used on a variety of shrimp products. The carotenoid index value for raw Alaska pink shrimp tails was 0.267 and the value for the machine-peeled canned shrimp was 0.059.  
[1 table, 3 references]

FTP

7.52 QUANTITATIVE ULTRAMICROANALYSIS OF AMINO ACIDS IN THE FORM OF THEIR DNS-DERIVATIVES. 3. ANALYSIS OF NATURAL AMINO ACIDS. CHARACTERISTICS OF THE METHOD

Spivak, V. A., V. A. Fedoseev, V. M. Orlov, and J. A. M. Varshavsky (Institute of Molecular Biology of the U.S.S.R. Academy of Sciences, Moscow B-312, and Institute of Genetics and Selection of Industrial Microorganisms, Moscow, U.S.S.R.)

Analytical Biochemistry 44, No. 1, 12-31 (November 1971)

This paper describes an ultramicromethod for the analysis of amino acids that has a sensitivity of  $1 \times 10^{-11}$  mole of amino acid, operating range of from  $1 \times 10^{-11}$  to  $5 \times 10^{-10}$  mole of amino acid in the initial mixture, and reproducibility (relative standard deviation) of 3-5%.

[4 figures, 4 tables, 39 references]

FTF

DLA [see references 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

6.130 RECOVERY OF FISH OIL AND PROTEIN FROM FISH PROCESSING EFFLUENT

Kato, Kenji, and Shizuhito Ishikawa (Kurita Cent. Lab., Kurita Water Ind., Ltd., Yokohama, Japan)

Chemical Abstracts 74, No. 18, 90931j (May 3, 1971)

6.130 FISH CONVERSION

Anderson, E. E.; Marine Technology Inc. (pat.)

U.S. Patent 3,586,515

Food Technology 25, No. 11, 116 (November 1971)

Spray-dried whole fish meal and oil are prepared from whole fish.

FTF

DLA [see references 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

6.89 STATUS OF THE PRECIOUS CORAL INDUSTRY IN JAPAN, TAIWAN, AND OKINAWA: 1970

Grigg, Richard W. (Hawaii Institute of Marine Biology, University of Hawaii, Honolulu, Hawaii)

University of Hawaii Sea Grant Program, Report No. UNIH-SEA-GRANT-AR-71-02, 14 pp. (November 1971)

The University of Hawaii is conducting a study of the ecology of precious corals and the development of precious coral fisheries in Hawaii. One of the major goals for this program is to survey the existing coral jewelry industry, which currently is almost exclusively dependent on the Japanese market. This report describes the results of a three-week trip in the summer of 1970 to Japan, Taiwan, and Okinawa, where interviews with fishermen, merchants, and scientists were held. Information gathered included observations of vessels, gear, fishing techniques, and coral jewelry factories and data concerning the history of the fishery, production and depth of fishing grounds, various species, and catch and market statistics.

The term "precious coral" classically refers to the red corals of the genus *Corallium*. These species are all placed in the family *Corallidae*, order *Scleractinia*, subclass *Octocorallia*, class *Anthozoa*, phylum *Cnidaria*. At present there are seven species known to inhabit the Indo-Pacific Ocean. Species of commercial importance in the Orient include the Japan (Bayer), (1961) *Corallium* *rubrum* (Linn.), *Corallium* *officinale* (Linn.), *Corallium* *spicatum* (Linn.), and the pink coral *Corallium* *sinense* (Linn.).

[see references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 4



# 7.9 A NEW PROCEDURE FOR ISOLATING POULTRY AROMA ESSENCE

Nonaka, M. (Western Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Berkeley, Calif. 94710)  
Food Technology 25, No. 11, 45-46, 48, 50 (November 1971)

The aroma essence from poultry meat is isolated by capturing the essence from the cooking vapors of the meat in di-n-butyl phthalate or extracting the essence from the broth of the cooked meat. The di-n-butyl phthalate selectively entrapped the volatile components so that the aroma essence had the main aroma characteristics of the original meat product. Entrapped in this manner, the essential volatile components are concentrated and remain stable. Also, the poultry meat aroma constituents can be removed easily and completely from the di-n-butyl phthalate by distillation and then used to fortify the flavor of many poultry products or to develop new products.

[1 figure, 1 table, 13 references]

FTP

Chemical Abstracts 75, No. 13, 84562u (September 27, 1971)

7.591 L-GLUTAMATE DEHYDROGENASE (DOGFISH LIVER AND CHICKEN LIVER)

Corman, Leonard, and Arvind Inamdar (Sch. Med. Dent., Tufts Univ., Boston, Mass.)

## FLAVORS AND ODORS OF FISH OILS

Stansby, Maurice E. (Pioneer Research Laboratory, National Marine Fisheries Service, NOAA, 2725 Montlake Blvd. East, Seattle, WA 98102)  
Journal of the American Oil Chemists' Society 48, No. 12, 820-823 (December 1971)

Odors and flavors in fish oils arise from the presence of metabolites and spoilage products of fish protein, and from oxidation products of the oil. The odor and flavor of the meat of animals fed excessive amounts of fish oil arise from the polyunsaturated components of the fish oil, rather than from the oxidation products of the oil or from the original flavor and odor of the oil. Refining of the oil removes objectionable odors and flavors. Also, the objectionable odor and flavor of fish oils can be masked by use of certain additives.

[71 references]

FTP

Chemical Abstracts 75, No. 7, 45991p (August 16, 1971)

8.59 PHOSPHOLIPID COMPLEX POLYMORPHISM IN PACIFIC OCEAN PERCH.  
(9.125) (0.38) SEBASTODES ALUTUS  
(1.9)

Johnson, Alyn Gregory, Fred M. Uter, and Harold O. Hodgins (Biol. Lab., Natl. Mar. Fish. Serv., Seattle, Wash. 98102)

# 9.10 THE NEED FOR ENVIRONMENTAL LABORATORIES

Kneafsey, Patrick (Environmental Services Division, Health and Social Services Department, State of New Mexico, Santa Fe, NM 87501) 01  
Journal of Milk and Food Technology 34, No. 11, 526-528 (November 1971)

The need to preserve the environment for future generations makes it essential that ecological laboratories be developed. The traditional laboratories are not suitably organized, equipped, or staffed to handle environmental and ecological problems. Furthermore, in the past, standards and control programs have been based on the concept of control feasibility rather than the concept of environmental maintenance. An environmental laboratory should be based on the following concepts: (1) It must be based on "man in his environment." (2) It must be regional in scope. (3) It must have research capabilities in the fields of economics, sociology, political science, education, and the physical sciences. (4) Its services must be available to all agencies in the region involved with environmental problems. (5) Its prime mission must be not only to identify factors which result in environmental degradation but also to identify those components which make up a "quality environment."

FTP

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(7)  
8

## 9.11 POLAROGRAPHY OF SEAWATER. II. COMPLEX FORMATION OF CADMIUM WITH EDTA

Maljković, Dubravka (Center for Marine Research, Institute "Rudjer Bošković, Zagreb, Yugoslavia), and Marko Branica (Faculty of Technology, University of Zagreb, Sisak Croatia)  
Limnology and Oceanography 16, No. 5, 779-785 (September 1971)

Earlier work has shown that the uptake of Co, Mn, and Zn in mussels is decreased by EDTA (ethylenediaminetetraacetic acid). In the present work, the researchers studied the formation of a complex of cadmium and EDTA in sea water and in sodium chloride solution by means of square-wave polarography. The rate of formation of the Cd-EDTA complex in sea water is lower than that in a solution of sodium chloride or a solution of calcium and sodium chloride. The degree of complex formation of cadmium with EDTA (in the presence of chloride and calcium ions) is diminished by the formation of cadmium monochloro complex and by the competition between calcium and cadmium.

[5 figures, 1 table, 5 references]

FTP

Chemical Abstracts 75, No. 17, 105937n (October 25, 1971)

## 9.19 NEUTRON ACTIVATION ANALYSIS OF ENVIRONMENTAL CONTAMINATION AND DISTRIBUTION OF MERCURY IN ANIMALS AND FISH

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 4 PAGE 15

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 4 PAGE 15



GENERAL CIRCULATION AND WATER CHARACTERISTICS  
IN THE SOUTHERN CALIFORNIA BIGHT

9.11

Jones, James H. (Southern California Coastal Water Research Project, 1100 Glendon Ave., Los Angeles, Calif. 90024)  
Southern California Coastal Water Research Project Report, viii + 37 pp. (October 1971) Price \$1.90.

The transport and fate of a substance introduced into the Southern California Bight is dependent upon the physical and chemical properties and circulation patterns of the coastal waters in the area. When available literature on these phenomena was analyzed and summarized, a coherent picture of the general features of offshore circulation in southern California and its seasonal variations emerged. However, the summary revealed that present knowledge on certain topics is insufficient for predicting the dispersion of a trace material entering the Bight. In particular, there is need for more information on the nature and causes of near-shore circulation, which is important in determining the residence time of a parcel of water of the half-life of a conservative substance in the Bight. Valid estimates of these parameters must await specialized field programs and dynamic models of the Bight's circulation, but an estimate of 2 to 3 months for the residence time is in reasonable agreement with the available information. A discussion of research on aperiodic natural fluctuations, which may affect local marine life or bring biota from other regions into the southern California area, shows that studies to date have focused on one or two isolated phenomena. To predict average conditions as well as maximum expected deviations in the Bight, a detailed survey of the available data on all such large-scale fluctuations is needed.

Author's abstract

[17 figures, 192 references]

THE LESSON OF THE ASKÖ LAB

(6.10)

Jamison, Andrew  
New Scientist 52, No. 773, 78-80 (December 9, 1971)

A team of Swedish scientists (biologists, chemists-geologists) at the Askö Laboratory are trying to develop a systematic model of the Baltic ecosystem in order to understand what pollution is doing to the Baltic. According to Bengt-Owe Jansson, Director of the Askö Laboratory, the question involves the study of the inflow of organic material and other pollutants, along with the detailed interactions and interrelationships of the biological system, to develop a model that traces the flow of pollution and other energy sources through the sea. The model, simulated on a computer, hopefully would be able to predict changes in the system that could be expected to result from changes in one or another pollution input.

ALA

The author states that this proposed new computer program is more advantageous for processing oceanographic data than the Lagrange's method.

FTP

Akiba, Yoshio (Laboratory of Oceanography and Meteorology, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)  
Bulletin of the Faculty of Fisheries Hokkaido University 21, No. 4, 299-304 (February 1971)

NOTE ON THE PROGRAMMING FOR OCEANOGRAPHIC DATA PROCESSING

HYDRATION CAPACITY AS AN INDEX OF SHRIMP MICROBIAL QUALITY

7.80

Shelley, Leora A., and James M. Jay (Department of Biology, Wayne State University, Detroit, MI 48202)

Journal of Food Science 36, No. 7, 994-997 (November-December 1971)

The change in the hydration capacity of shrimp meat during storage at 5°C. was determined in an attempt to develop an index of microbial quality for shrimp based on these hydration capacity values. The samples of stored shrimp were tested at 24- to 48-hr. intervals for: total bacterial count, pH, water holding capacity, extract-release volume, viscosity value, and swelling value. The extract-release volume values seemed to offer a suitable index for detecting incipient spoilage of shrimp but further data are needed to firmly establish the relationship.

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[21 references]

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EFFECTS OF SHORT-TERM EXPOSURE OF LEUCISCUS RUTILUS  
TO PHENYL MERCURIC HYDROXIDE  
CHROMATOGRAPHIC DETECTION OF ORGANOPHOSPHORUS PESTICIDES AND  
THEIR BREAKDOWN PRODUCTS

9.19  
(1.92)

Lindahl, Per E., and C. E. B. Hell (Inst. Zoophysiol. Uppsala, Sweden)  
Chemical Abstracts 75, No. 3, 19124p (July 19, 1971)

This is the first of two volumes which deal with pesticidal chemicals; they will be followed by three more concerned with the practical aspects of handling pesticides in the environment.

The present volume, in three chapters, is concerned with the properties and uses of pesticides. The first chapter, by Robert Metcalf, is concerned with the chemistry and biology of pesticides (fungicides, herbicides, insecticides, molluscicides, nematocides, rodenticides). The second chapter, by T. R. Fukuto and J. J. Sims, is concerned with insecticide metabolism in plants and animals, and includes a brief review of the literature on fungicide metabolism. The third chapter, by J. E. Loeffler and J. van Overbeek, deals with herbicide metabolism.

FTP

PESTICIDES IN THE ENVIRONMENT, VOLUME 1, PART 1

(9.10)

White-Stevens, Robert (editor)  
Published by Marcel Dekker, Inc., (n.d.) 270 pp. Price \$11.20  
Harold Egan (reviewer)  
New Scientist 52, No. 773, 117 (December 9, 1971)



9.11 SHIP'S INFLUENCE ON SURFACE AND RAWINSONDE TEMPERATURES  
(2.12) DURING BOMEX

Wisner, Warren M. (State Climatologist for Missouri)  
NOAA Technical Memorandum ERL BOMAP-6 (June 1971) Available from the National Technical Information Service, U.S. Department of Commerce, Sills Bldg., Springfield, Va. 22151; Order No. COM-71-00950.  
NOAA Publications Announcement No. 71-77, 10, Item 71-17-18-01 (October 1971)

The Barbados Oceanographic and Meteorological Experiment (BOMEX), conducted in the summer of 1969, provided an opportunity to examine the representativeness of data on sea-air interaction processes obtained from a variety of sensors. This paper presents a comparative analysis of observations made from conventional facilities located amidships on five fixed ships with data obtained from instruments mounted on a boom extending forward from the bow of each ship. Results based on temperature recordings indicate that the boom measurements probably are more reliable when the relative wind blows off the sea past the boom and then over the ship. When the wind off the sea blows over the ship and then over the boom, however, ship's influence is such that the boom and shipboard instrumentation provide equally reliable measurements. (Author abstract, mod. by SK) Reprinted

9.125 THE EFFECT OF TAGGING UPON THE FATTY ACID METABOLISM  
OF JUVENILE PINK SALMON

Saddler, James B., and Rick Cardwell (Fisheries Research Institute, College of Fisheries, University of Washington, Seattle, Wash. 98105)  
Comparative Biochemistry and Physiology 39, No. 4A, 709-721 (August 1, 1971)

One method of studying migration patterns, stock identity, and oceanic growth rates of salmon is by tagging. Yet the tag or stress (such as handling, confinement, anesthesia) inherent in the tagging operation may affect the salmon's behavior, feeding habits, and susceptibility to predation and disease. In this report, the effects of the Dennison internal anchor tag on the mortality and physical condition and on the qualitative and quantitative lipid changes in tagged and untagged pink salmon (*Oncorhynchus gorbuscha*) are shown.

Wild juvenile pink salmon were caught at sea and separated into two groups. Except for application of the Dennison tag, fish in the two groups were treated and handled alike. During the first 17 days of holding, 2 (3.6%) of the 55 untagged salmon died and 14 (26.9%) of the tagged ones died. Differences in mortality were significant at the 95% confidence level (as tested by chi-square analysis). Average weight of the untagged fish, though slightly higher than that of the tagged fish, was not statistically different. Although total body weight of the tagged fish was lower, their total liver weight was about 28% higher; the lipid content of their liver was almost double. After 20 days' holding, the lipid content of the muscle of tagged fish was 20% lower than that of the untagged fish; 12 days later the proportion of muscle fat in the tagged fish increased slightly. Specific fatty acids mobilized extensively from muscle to liver tissue in the

9.12 THE ORIGINS OF TAXONOMY

Raven, Peter H. (Washington University, St. Louis, MO 63130), Brent Berlin, and Dennis E. Breedlove  
Science 174, No. 4015, 1210-1213 (December 17, 1971)

Only about 10 to 15% of the approximately 10 million kinds of organisms in the world have been described at some level. Because of the rapid growth of the human population, most of the remainder will disappear from the earth before they are seen by a taxonomist. Furthermore, for more than 99% of the species that have been described, we know only a few morphological facts and one to several locations where they occur. The authors believe that these facts suggest a more rigorous application of priorities in systematic biology and a careful review of the principles upon which our taxonomic system is based.

Problems with the taxonomic system arise from the fact that it is not designed for information retrieval. In folk taxonomies, names are given to organisms and are used to communicate about the organisms with other persons who already know the culturally significant properties of the organisms being discussed. With modern electronic data processing equipment, information about organisms can be recorded, retained in a data bank, and then used for various purposes including the construction of various taxonomic systems. By using data processing equipment to its full potentialities, we should achieve a qualitative improvement in our perception of the living world. [14 references] FTP

9.13 LIPIDS OF MASU SALMON (*ONCORHYNCHUS MASOU*). I. VARIATIONS  
OF THE LIPID CONTENT AND THE FATTY ACID COMPOSITION OF JUVENILE  
MASU SALMON DURING THE PERIOD OF SMOLT-TRANSFORMATION, AND ON  
THE INFLUENCE OF LIGHT UPON THOSE VARIATIONS

Ōta, Tōru, and Minoru Yamada (Laboratory of Chemistry of Fish Oil, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)  
Bulletin of the Faculty of Fisheries Hokkaido University 22, No. 2, 151-158 (August 1971) (In Japanese; figures, tables, and abstract in English)

This work involved the examination of the variation of the lipid content of the muscle, and of the fatty acid composition of the muscle lipids, of cultivated juvenile Masu salmon during their smolt-transformation stage; also, the influence of light upon the variations was determined. The lipid content of the muscle of the control group [not exposed to light treatment] decreased rapidly during the period from the pre-smolt to the mid-smolt stage; the lipid content then remained about the same level during the period from the mid-smolt to the post-smolt stage. The lipid content of the muscle of the group exposed to light treatment remained constant during the pre-smolt and mid-smolt stages then decreased gradually during the period from the mid-smolt to the post-smolt stage. At the post-smolt stage, the lipid content of the muscle in the control group was higher than that in the illuminated group.

The level of total saturated and total monoenoic acids in the lipids of the muscle decreased during the period from the pre-smolt to the post-smolt stage; the rate of decrease of the total monoenoic acids was greater for the illuminated group than for the control group. [3 figures, 5 tables, 7 references] FTP







Ball, H. J., A. L. S. Munro, A. Ellis, K. G. R. Elson (Marine Laboratory, Aberdeen Scotland), W. Hodgkiss (Torry Research Station, Aberdeen), and I. S. McFarlane (Highlands and Islands Development Board, Inverness)  
Nature 234, No. 5329, 417-418 (December 17, 1971)

Infectious pancreatic necrosis was positively identified as causing an epizootic of rainbow trout fry (*Salmo gairdneri*) in a Scottish trout farm during February and March of 1971. Infectious pancreatic necrosis is a highly contagious viral disease of young trout, endemic in wild salmonids and some trout farms in the United States, and first recorded in Europe in 1965.  
[2 figures, 9 references]

FTP

9.15

## NEMATOCYST TOXIN OF METRIDIDUM

Goodwin, M. H., and M. Telford (Dep. Zool., Univ. Toronto, Toronto, Ontario, Canada)  
Chemical Abstracts 75, No. 21, 127141a (November 22, 1971)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 19

## POTENTIAL USES OF WASTE WATERS AND HEATED EFFLUENTS

Thorslund, Anders E. (Fishery Resources Division, Department of Fisheries, FAO, Rome, Italy)  
EIFAC Occasional Paper No. 5, 23 pp. (September 1971) (European Inland Advisory Commission, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, Rome, Italy)

Considerable research is being carried out in Poland on the utilization of wastes (domestic, industrial, and heated effluents) for aquaculture, with the additional objective of controlling water pollution. Because FAO has considerable interest in promoting the production of fish and in combatting water pollution, the author spent about 2 weeks in Poland visiting several fishery research institutions to obtain information on how wastes are being used for fish production. The information collected is reported in this article under three sections:  
Section I. "The Use of Domestic Waste Water for Fish Culture in Poland." Crucian carp can be cultivated year-round in undiluted effluents from an activated sludge plant. Yields of fish greater than 1,000 kg/ha. were obtained without artificial feeding. [figure, 3 tables, 3 references]

Section II. "Treatment of Wastes from a Sugar Factory." Experimental data indicate that carp culture in sugar beet factory wastes is possible over a yearly cycle with good yields of fish (0.005-0.004) kg/ha. [table, 5 references]  
Section III. "Biological Control and Utilization of Heated Effluents, Runoff Projects." Polish scientists have carried out detailed studies on the biological effects of heated effluents on a system of five interconnected lakes in central

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 19

## AQUACULTURE: A NEW ENGLAND PERSPECTIVE

Gaucher, Thomas A. (editor)  
New England Marine Resources Information Program, 119 pp. (1971) Available from TRIGOM, 96 Falmouth St., Portland, ME 04103; and The New England Regional Commission, 55 Court St., Boston, MA 02108.

On October 21st-23rd, 1970, a workshop/conference "Aquaculture: The Determinants of Success," was held at the New England Center for Continuing Education at Durham, New Hampshire. The Conference was planned and conducted by The Research Institute of the Gulf of Maine, and sponsored by the New England Regional Commission. The New England Marine Resources Information Program, a Sea Grant Program at the University of Rhode Island co-sponsored the report. The objective of the Conference was to consider and make recommendations on all the factors--legal, economic and technological--which must contribute to the success of commercial aquaculture. The contents of the report include:

"Conference Recommendations," by Donald B. Horton (Research Institute of the Gulf of Maine, 96 Falmouth St., Portland, ME 04103) pp. 1-6.

"A Technological Perspective," by Thomas A. Gaucher (Natural Resources Consultant, 188 East Ave., Westerly, RI 02891) pp. 7-21. [3 tables, 17 references, 1 appendix]

"An Economic Perspective," by John M. Gates (Department of Resource Economics, University of Rhode Island), and George C. Matthiessen (Marine Research Foundation Inc., P.O. Box 81, East Wareham, MA 02538) pp. 22-50. [1 figure, 54 references]  
"A General Legal Perspective," by Harriet P. Henry (Attorney, 174 Prospect St., Portland, ME 04103) pp. 51-56.

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 19

## FISH TOXICANT COMPOSITIONS AND METHOD OF USING THEM

Berger, Bernard L.; assignor to the U.S.A. (Secretary of the Interior) (pat.)  
U.S. Patent 3,608,072 (September 21, 1971)

Undesirable fish are killed by exposing them to a solution or dispersion of a mixture of antimycin A and naled (1,1,2,2-dibromo-2,2-dichloroethyl dimethyl phosphate).  
[1 p]

Three major problems have become apparent during the early experimental work designed to determine the feasibility of shrimp mariculture. Each problem--shrimp diseases, nutrition, and maturation--is discussed as well as ongoing and proposed research.  
Abstract reprinted in part

American Fish Farmer 2, No. 6, 5 pp. (May 1971)  
Government Research Announcements 71, No. 20, 67 (October 25, 1971)

Neal, Richard A. (National Marine Fisheries Service, Biological Laboratory, Galveston, Tex.)  
SHRIMP CULTURE RESEARCH AT THE GALVESTON BIOLOGICAL LABORATORY

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 61

CORNELLUS K., and M. ALICE MURPHY (Bureau of Commercial Fisheries Biological

NOAA Publications Announcement No. 71-77, 9, Item 71-17-16-22 (October 1971)

Reprinted

9.16

## 9.16

AD-126 948; PC\$3.00; ME\$0.95.

Author's abstract in part

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Kelley, William E. (Euclid, Ohio), and Vernon C. Goldizen (Cleveland Heights, Ohio)

Newman, Martin W. (National Marine Fisheries Service, Biological Laboratory, Oxford, MD 21654)

Government Research Announcements 71, No. 22, 42 (November 25, 1971)

Author's abstract in part

Journal of Protozoology 18, No. 3, 526-537 (August 1971)

# AN ANNOTATED LIST OF PROTOZOAN PARASITES, HYPERPARASITES,

 $(9.14)(1.89)$ 

ary 1971)

[2 cables, 9 references]

ДЛЯ

Poland that are used as a circulating cooling system for two baseload thermopower



Sick, Lowell V., James W. Andrews, and David B. White (Skidaway Institute of Oceanography, 55 West Bluff Road, Savannah, GA 31406)  
Fishery Bulletin 70, No. 1, 101-109 (January 1972)

The harvest of commercial shrimp suffers great seasonal variability and has failed to keep pace with ever-increasing domestic and export demands. Several attempts have been made to culture shrimp in natural ponds, restricted portions of bays and estuaries, and laboratory tanks. In general, these efforts have had limited success and have explicitly illustrated the need for more accurately defining the nutritional and environmental requirements for culturing these species.

In the present study, an attempt was made to develop a suitable experimental culture system which could serve as a model for future nutritional and environmental studies. Several environmental factors were examined, and as a result, environmental conditions were created which would allow acceptable growth and survival. Having first established suitable culture conditions, several diets were evaluated in preliminary studies of the nutritional requirements of shrimp.  
[3 figures, 2 tables, 18 references]

Reprinted in part

Mosevich, M. V. (GosNIORKH, Leningrad, U.S.S.R.)  
Chemical Abstracts 75, No. 22, 132381e (November 29, 1971)

#### ACTION OF SOME SALTS AND THEIR IONS ON SELF-PURIFICATION PROCESSES IN THE WATER OF FISH-HATCHERIES

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 21

9.16

Yeaple, Donald S. (JBF Scientific Corporation, 2 Ray Ave., Burlington, MA 01803)  
Nature 235, No. 5335, 229-230 (January 28, 1972)

Earlier work has demonstrated that certain mosses and lichens can concentrate heavy metals. If so, it is possible that this phenomenon might be used as an indicator of the transport of mercury through the atmosphere. In the present study, samples of mosses were collected to provide information on the level of mercury in moss around several types of populated areas. Data presented in this report (see following table) are from mosses collected within an 80-mile radius of Boston, Mass., along the Maine coast, near the tops of Mt. Katahdin in Maine and Mt. Washington in N.H., and from Walden, N.Y. (60 miles north of New York).

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 21

Bower, B. T., G. O. G. Lof (Resources of the Future, Washington, D.C.), and W. M. Hearon (Portland, Oreg.)  
Natural Resources Journal 11, No. 4, 605-623 (October 1971)

In this paper, the authors describe and illustrate the major factors that affect residuals generation in the pulp and paper industry. The focus is on the major variables affecting generation of residuals in the production of paper in the pulp-paper mill and in converting to paper products. The emphasis is on the effects of: brightness as a product specification; processes for preparing pulp (groundwood, sulfite, and repulped waste paper); and nature of raw material (wood types and waste paper). Some conclusions drawn from the analysis are as follows:

The simple knowledge that different mixes of residuals are generated by different production combinations is not sufficient for policy-making with respect to residuals management. The relative external costs resulting from discharge into the environment of different residuals must be determined.

Product specifications relate to residuals generation--for example, higher brightness, requiring more bleaching, adds to the generation of residuals and hence to costs of residuals management.

The reuse of paper residuals is not a panacea relative to managing the quality of the environment--the reuse of paper residuals requires processing that results in the generation of substantial quantities of residuals.

[14 footnotes]

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 21

Campbell, John W.

Anchor 2, No. 10, 412-420 (October 1971) (San Francisco Aquarium Society Inc., California Academy of Sciences, San Francisco, Calif. 94118)

Of the three types of pollution--actual, political, and hysterical--the agitation over mercury in canned tuna exemplifies both hysterical and political, but not actual, pollution. (This does not mean that excessive local concentrations of mercury are not causing actual pollution.) To solve the problems created by actual pollution, we need balance and judgment, not imbalance and insanity that make practical balances unattainable because of the hysterical demands of absolute elimination.

LB

Harrison, Florence L. (Lawrence Radiat. Lab., Univ. California, Livermore, Calif.)  
Chemical Abstracts 75, No. 5, 30880c (August 2, 1971)

BIOLOGICAL IMPLICATIONS OF NUCLEAR DEBRIS IN AQUATIC ECOSYSTEMS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 21

## 9.19 (8.42)

Description of source of moss sample	Total mercury in moss sample	Description of source of moss sample	Total mercury in moss sample
Large city	P.P.B. 1,450	Suburb--source industry-2	P.P.B. 935
Industrial suburb-1	1,320	Small industrial city	1,350
Industrial suburb-2	675	Medium size town concentrated in a small area	2,000
Residential suburb-1	250	Small coastal town-1	50
Residential suburb-2	330	Small coastal town-2	234
Suburb--some industry-1	910	Small coastal town-3	566
Rural area-1	286	Medium-sized coastal town	<50
Rural area-2	634	High, isolated mountain area-1	284
Residential suburb-3	465	High, isolated mountain area-2	<50

[1 table, 6 references]

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## 9.19 (8.9)

## HEAVY METAL CONCENTRATION IN COASTAL WATERS

Abdullah, M. I., L. G. Royle (Department of Oceanography, University of Liverpool), and A. W. Morris (Marine Science Laboratories, Menai Bridge, Anglesey, England) Nature 235, No. 5334, 158-160 (January 21, 1972)

Data are presented on the general levels and distribution of some trace metals (Cu, Pb, Cd, and Zn) in surface waters of Liverpool Bay, Cardigan Bay, and the Bristol Channel. The areas selected contain regionally different effluents: Cardigan Bay is relatively free from industrial and domestic effluent; Liverpool Bay contains both domestic and industrial effluents; and Bristol Channel contains industrial and domestic effluent and runoff from a mineralized zone in north Devon. Data on average levels of the trace elements in the surface waters are shown in the following table.

Source of surface water sample	Value	Concentrations of trace metals			
		Cu	Pb	Cd	Zn
Liverpool Bay	Low	0.90	0.66	0.14	2.30
	Mean	1.45	1.74	0.27	11.86
	High	3.03	4.17	0.74	47.6
Cardigan Bay	Low	0.98	1.12	0.48	3.63
	Mean	1.72	2.24	1.11	7.46
	High	4.02	3.53	2.41	19.65
Bristol Channel	Low	1.02	0.35	0.28	3.57
	Mean	2.07	1.18	1.13	9.98
	High	4.74	5.06	4.20	21.42

Apparently, the distribution of trace metals in coastal waters is controlled by the amounts of the metals carried into and the circulation of the water in such environments [1 figure, 1 table, 2 references]

FTP

## 9.16 STOCKING DENSITY AND WATER REQUIREMENTS FOR HIGH-DENSITY CULTURE OF CHANNEL CATFISH IN TANKS OR RACEWAYS

Andrews, James W. (Skidaway Institute of Oceanography, Savannah, Ga.) Feedstuffs 44, No. 6, 40-41 (February 7, 1972)

Channel catfish can be reared at densities of up to 8 lb. per cu. ft. of water (1 lb. of fish per gal. of water). During a 200-day experimental period, there was a gain of over 11 lb. per cu. ft. of water. Extrapolation of this growth rate curve data to a full 365-day growing period would give a production of over 20 lb. per cu. ft. of water. The food conversion ratio for the catfish was 1.6 (lb. gain per lb. feed). The author concludes that high density culture of catfish in tanks or raceways may be economical provided ideal environmental conditions and water temperatures can be maintained at low cost.

[4 figures, 5 tables, 11 references]

FTP

and Skeletoneura costatum. [9 figures] 9  
Six species of marine algae were cultured in modified Hirano's and Umebayashi's solutions. Five algae were mentioned in the abstracts: Chaetoceros simplex var. californicus, Monochrysis lutheri, Phaeodactylum tricornutum, Platymonas sp., and Skeletoneura costatum. [9 figures] 9

Pyen, Choong Kyu, and Il Mann Shong Bull. Fish. Res. Agency 6, (233-239) (1970)

Korean Scientific Abstracts 3, No. 4, Abstract No. 71/411, 117 (21) (August 1971)

THE CULTURE OF FOOD ORGANISMS FOR THE PRODUCTION OF EDIBLE MOLLUSCAN SEEDLINGS

9.16

## 9.19 ECOSYSTEM ANALYSIS: BIOME APPROACH TO ENVIRONMENTAL RESEARCH

Hammond, Allen L. Science 175, No. 4017, 46-48 (January 7, 1972)

A better understanding of ecological systems than is now available is required to determine the long-range effects of manmade changes in the environment. Both basic theory and quantitative measurements of ecological changes are now lacking. As part of the United States participation in the International Biological Program, a major attempt is underway to understand how entire ecosystems function and, by modeling the behavior of these systems, to predict how the ecosystems will respond to manmade stresses. The author indicates that this ecosystem analysis program is having a major impact on the way many scientists perceive ecological problems and it is likely to produce some practical results that will aid in the management of natural resources.

More than 600 scientists (biologists, hydrologists, meteorologists) and engineers are participating in the ecosystem analysis program. The work constitutes the first attempt to conduct ecological research with large programs of directed research rather than with the traditional individual investigator. The study is being carried out on five biomes (habitat types)--grasslands, deciduous forests, coniferous forests, deserts, and arctic tundra. Plans are being made for research on another biome, tropical forests.

The author believes that the ecosystem analysis program may substantially improve man's ability to manage the environment and to predict long-term changes. Even if it does not do this, the training of a new type of ecologist seems certain to advance the attempt to understand ecological processes. [1 figure] FTP



Cole, H. A. (organizer)  
Proceedings of the Royal Society London, Biological Sciences 177, No. 1048, 275-468 (April 13, 1971)

Card A

This entire issue of the journal is devoted to papers presented at the subject discussion. The meeting, which was held April 28 and 29, 1970, was divided into four sections, as shown below.

"Objectives of Biological Pollution Studies," by H. A. Cole (Fisheries Laboratory, Lowestoft, England); pp. 277-278.

I. Measurements of Pollution Effects on Living Organisms

"Bioassays To Determine Allowable Waste Concentrations in the Aquatic Environment," by C. M. Tarzwell (National Marine Water Quality Laboratory, Federal Water Quality Administration, Department of the Interior, West Kingston, R.I. 02892); pp. 279-285. [11 references]

"Techniques for Assessment of Pollution Effects on Seabirds," by I. Prestt (The Nature Conservancy, Monks Wood Experimental Station, Huntingdon); pp. 287-294. [34 references]

"Assessment of Pollution Effects by the Use of Algae," by Elsie M. Burrows (Hartley Botanical Laboratories, University of Liverpool, England); pp. 295-306. [5 figures, 22 references]

II. Sublethal Effects and Changes in Ecosystems

"Assessment of the Effects of Pollutants on Physiology and Behaviour," by (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 23

Cole, H. A. (organizer)  
Proceedings of the Royal Society London, Biological Sciences 177, No. 1048, 275-468 (April 13, 1971)

Card B

IV. Prevention and Monitoring

"Pollution Prevention," by E. L. Cronin (Chesapeake Biological Laboratory, Natural Resources Institute, University of Maryland, Solomons, Md. 20688); pp. 439-450. [5 tables, 15 references]

"Monitoring the Marine Environment," by A. Preston and P. C. Wood (Ministry of Agriculture, Fisheries and Food, Radiobiological Laboratory, Lowestoft, and Fisheries Laboratory, Burnham-on-Crouch, England); pp. 451-462 [1 figure, 1 table, 11 references]

"Future Research Needs," by R. W. Edwards (The University of Wales Institute of Science and Technology, King Edward VII Avenue, Cathays Park, Cardiff, U.K.); pp. 463-468.

Preston, Alan (Minist. Agric. Fish. Radiol. Lab., Lowestoft, Suffolk, England)  
Chemical Abstracts 75, No. 5, 30869f (August 2, 1971)

CONCENTRATIONS OF IRON-55 IN COMMERCIAL FISH SPECIES  
FROM THE NORTH ATLANTIC

9.19  
(1.51)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 23

Young, Chen-Shyong (Southern Coastal Water Research Project, 1100 Glendon Ave., Los Angeles, Calif. 90024)  
Southern California Coastal Water Research Project, v11 + 30 pp. (October 1971)  
Price \$2.00.

The coastal waters of southern California receive thermal energy from various man-induced inputs, including cooling waters from power plants and municipal and industrial waste effluent and associated oxidizable organic matter. Thermal energy is also absorbed naturally at the air-sea interface. An energy budget calculation is used to compare these inputs and show that the current man-induced thermal energy contribution (approximately  $95 \times 10^{10}$  Btu/day) to the coastal waters of the Southern California Mainland Shelf is about 0.6 percent of that naturally absorbed at the 1,400 sq mi of water surface. On the same broad-scale basis, the present man-made contribution is estimated to induce a temperature elevation of less than  $0.2^\circ\text{F}$  above the natural ambient temperature level. The total water surface area having a  $2^\circ\text{F}$  or higher temperature elevation as a result of power-plant thermal discharges alone is estimated to be between 3.6 and 7.5 sq mi, depending on the method of calculation, and this area can be considerably reduced by proper diffuser design.

[6 figures, 9 tables, 40 references]

Author's abstract

Olsson, Mats (Naturhist. Riksmuseet, Stockholm, Sweden)  
Chemical Abstracts 75, No. 17, 109145a (October 25, 1971)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 23

MERCURY IN FLORA AND FAUNA

9.19

9.19  
(8.9)

DDT RESIDUES IN EIGHT CALIFORNIA MARINE FISHES

Shaw, Stanton B. (Hopkins Marine Station, Stanford University, Pacific Grove, CA 93950)  
California Fish and Game 58, No. 1, 22-26 (January 1972)

Levels of DDT, DDD, DDE, and total DDT residues in the livers and flesh of marine fishes, mainly from Monterey Bay, were determined using gas-liquid chromatography. Mean values for total DDT residues for liver ranged from 4.7 ppm wet weight (rough scale rattail) to 0.22 ppm (lingcod), and for flesh ranged from 2.0 ppm (sablefish) to 0.035 ppm (lingcod). Maximum values for total DDT residues in some individual fishes approached or exceeded FDA limits of 5.0 ppm wet weight, e.g., for livers: sanddab 13 ppm, roughscale rattail 7.9 ppm, sablefish 6.9 ppm, English sole 6.1 ppm, and petrale sole 4.8 ppm; for flesh: sablefish 6.3 ppm and roughscale rattail 4.7 ppm.

Author's abstract

Underdal, Bjarne, and Tore Hastein (Dep. Food Hyg., Vet. Coll. Norway, Oslo, Norway)  
Chemical Abstracts 75, No. 4, 24988c (July 26, 1971)

MERCURY IN FISH AND WATER FROM A RIVER AND A FJORD  
IN THE KRAGEROE REGION, SOUTH NORWAY

9.19  
(1.0141)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 4 PAGE 23



Harville, John P. (editor)  
Technical Publication 71-3, viii + 190 pp. (1970) (Moss Landing Marine Laboratories of the California State Colleges at Fresno, Hayward, Sacramento, San Francisco, and San Jose, Calif.)  
In September 1967 the Moss Landing Marine Laboratories undertook a long range study of potential effects of Kaiser Refractories industrial effluent upon the marine environment of the Moss Landing area.

Francisco, and San Jose, Calif.)

In September 1967 the Moss Landing Marine Laboratories undertook a long range study of potential effects of Kaiser Refractories industrial effluent upon the marine environment of the Moss Landing area.

These investigations followed three primary thrusts:

1. Determination of physical characteristics and dynamics of the water mass in the proposed outfall area, and assessment of bottom structure, sediments, and sediment transport characteristics of the area.
2. Biological investigations of bottom fauna of the proposed outfall area, with ancillary studies of plankton, fishes, and intertidal fauna.

3. Field and laboratory studies of the impact of various dilutions of Kaiser effluent upon selected bioindicator plant and animal species. [62 figures, 33 tables, 77 references, 2 appendices] From editor's introduction

FTIR

Official Gazette of the U.S. Patent Office 891, No. 4, 1359 (October 26, 1971)

Texaco Co. Inc. (pat.)  
U.S. Patent 3,614,873

(0.8)  
Cole, Edward L. (Fishkill, N.Y.), and Howard V. Hess (Glenham, N.Y.); assigns to

## FREEZING OIL SPILLS

.19 (9.3)(7.43)(0.4)

"Ecological Effects of Sewage Discharge in the Marine Environment," by A. J. Sullivan (Lancashire and Western Sea Fisheries Joint Committee, 16, Walton's Parade, Preston, Lancashire, England); pp. 331-351. [1 figure, 1 table, 52 references]

"Some Changes in Intertidal Sand Communities Due to Thermal Pollution," by P. R. O. Barnett (Marine Station, Millport, Isle of Cumbrae, Scotland); pp. 353-364. [10 figures, 21 references]

### III. Effects of Particular Pollutants

"Mercury Pollution in Sweden With Special Reference to Conditions in the Water Habitat," by H. Ackefors (Institute of Marine Research, S-453 00 Lysekil, Sweden); pp. 365-387. [11 figures, 12 tables, 71 references]

"The Effects of Heavy Metals (Other Than Mercury) on Marine and Estuarine Organisms," by G. W. Bryan (The Laboratory, Citadel Hill, Plymouth, England); pp. 389-410. [9 figures, 4 tables, 77 references]

"Effects of Oil and Oil Dispersants on the Marine Environment," by R. G. J. Shelton (Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Burnham-on-Crouch, Essex, England); pp. 411-422. [18 references]

"The Biological Effects of Radioactive Wastes," by D. S. Woodhead (Ministry of Agriculture, Fisheries and Food, Radiobiological Laboratory, Lowestoft, Suffolk, England); pp. 423-437. [5 figures, 6 tables, 38 references]

Continued on Card B

9.19 POLYCHLORINATED BIPHENYLS: TOXICITY TO CERTAIN PHYTOPLANKTERS

Mosser, Jerry W., Nicholas S. Fisher, Tzu-Chiu Teng, and Charles F. Wurster (Marine Sciences Research, State University of New York, Stony Brook, NY 11790). *Science* 175, No. 4018, 191-192 (January 14, 1972)

polychlorinated biphenyls (PCBs), at concentrations as low as 10 to 25 parts per billion, reduced the growth rates of two species of marine diatoms; however, a marine green alga and two species of fresh-water algae were not inhibited at these or higher concentrations of the PCBs. Apparently, the sensitivity of these species to the PCBs paralleled their sensitivity to DDT. [2 figures, 23 references]

[2 tables, 20 references]

Median tolerance limits ( $TL_m$ 'S) of unbleached kraft mill effluent were estimated for white seaperch, striped seaperch, kelp greenling, starry flounder, English sole, and Dungeness crab. Also, preliminary information is reported on pile perch and walleye surfperch.

9.19 TOXICITY OF KRAFT MILL EFFLUENT TO SELECTED ESTUARINE ORGANISMS FROM YAQUINA BAY, OREGON

9.19 CHEMICAL POLLUTION: POLYCHLORINATED BIPHENYLS

Hammond, Allen L.  
Science 175, No. 4018, 155-156 (January 14, 1972)

The industrial chemicals polychlorinated biphenyls (PCBs) are widely distributed in the environment; they have been found in rainwater, in human tissue, and in many species of birds and fish. The PCBs apparently degrade very slowly under natural conditions. Also, they tend to accumulate in the food chain. Once they are ingested, the PCBs are stored in the fatty tissues of the body. Although small doses of chlorinated hydrocarbons can be toxic, it is not clear whether the amounts found in birds or fish have had any detrimental effect.

pesticides in fishes. [1 figure, 1 table, 17 references] FTP

Davis, Paul W. (Department of Pharmacology, University of Washington School of Medicine, Seattle, WA 98105), and Gary A. Wedemeyer (Western Fish Disease Laboratory, U.S. Department of the Interior, Seattle, WA 98115)  
Comparative Biochemistry and Physiology 40, No. 3B, 823-827 (November 1971)



9.2 (9.9) (7.6) (9.9) A PROPOSAL FOR PARTICIPATING IN NATURAL RESOURCE DEVELOPMENT STARTING WITH THE HIGH SEAS

Edwards, Daniel James (Department of Economics, University of Maryland, College Park, MD 20740)

Natural Resources Journal 11, No. 4, 636-656 (October 1971)

This article is an inquiry into the possibility of establishing a new institutional guideline to develop and distribute the natural resources in and under the high seas. The author proposes a new type of joint venture which would attract investors to explore and to develop natural resources by a specified target rate of return which includes any needed risk premium. When the investors have recovered their initial investment and are earning the cumulative target rate of return, any additional return (economic rent) is distributed to the entire world.

FTP

9.2 (9.10) THE ECONOMICS OF VANISHING SPECIES

Beachum, Frank T. (Department of Economics, Indiana University, Bloomington, IN 47401)

Natural Resources Journal 11, No. 4, 674-692 (October 1971)

The author discusses the economic aspects of the disappearance of species.

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9.2 (9.19) ENVIRONMENTAL POLICY: THEORY, CONCEPTS AND PROCESSES [A SYMPOSIUM]

(Authors and subjects listed below)

Natural Resources Journal 11, No. 3, 403-517 (July 1971)

Environmental policy is a relatively new field and still lacks a body of theory. The purpose of this symposium was to contribute towards a theoretical basis for environmental policy; the 12 articles are oriented along theoretical, conceptual, and philosophical lines.

"Environmental Policy and the Congress," by Henry M. Jackson (United States Senator, Washington, D.C.), pp. 403-415, [27 footnotes]

"Environmental Policy in a Hypertrophic Society," by Lynton K. Caldwell (Indiana University, Bloomington, Ind.), pp. 417-426, [11 footnotes]

"The Environmental Movement: Ambiguities and Meanings," by Grant McConnell (University of California [Santa Cruz Campus], Santa Cruz, Calif.), pp. 427-435, [1 footnote]

"Political and Social Accommodation: The Political Process and Environmental Preservation," by Norman Wengert (Colorado State University, Fort Collins, Colo.), pp. 437-446, [5 footnotes]

"Environmental Policy and Politics: Value and Power Context," by Daniel H. Henning (University of New Mexico, Albuquerque, N. Mex.), pp. 447-454, [21 footnotes]

"The Coordination of Legislative Policy and the Regulation of Private Interests: Some Suggested Pragmatic Principles for Environmental Policy," by Wolfgang E. Burchenne (Interparliamentary Working Center, Bonn, Germany) and William A. Irwin (University of Michigan, Ann Arbor, Mich.), pp. 455-466, [17 footnotes]

(over)

9.6 (9.6) EVERMAN'S GUIDE TO NUTRITION

Lachance, Paul A. (Department of Food Science, Rutgers University, P.O. Box 231, New Brunswick, NJ 08903) (reviewer)

The Family Guide to Better Food and Better Health, 277 pp. Published by Creative Home Library, Meredith Corp., Des Moines, Iowa (1971). Price \$7.95

Food Technology 25, No. 12, 26-29 (1238-1241) (December 1971)

This book on nutrition was written by a science writer for the average layman. The reviewer suggests that it should be required reading for the technologist as well.

FTP

9.6 (6.9) ABSTRACTS AND SUMMARIES OF LITERATURE ON DRUGS FROM THE SEA

1967-1971

Auffhammer, Ida Wallis, and Wm. B. Deichmann (University of Miami Sea Grant Program, Miami, FL 33149)

Technical Bulletin No. 91 (May 1971) Price \$6.00. (Information Services, University of Miami, Sea Grant Institutional Program, 10 Rickenbacker Causeway, Miami, FL 33133)

The Bulletin contains 643 abstracts, summaries, and references related to drugs and subdivided as to phylogenetic order of the source. It contains author indexes.

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9.2 (9.2) FOREIGN AID: NECESSARY? USEFUL? DAMAGING?

Bauer, Peter (London School of Economics, London, England)

New Scientist 52, No. 776, 252, 254-256, 258 (December 30, 1971)

The author, who is a professor of economics with special reference to economic development and underdeveloped countries, challenges the widely held views on international aid to underdeveloped countries.

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9.2 (9.2) THE INSURANCE DILEMMA

Redfield, Michael L.

Washington Sea Grant Publication WS-G-66-11-1 (November 1966)

Marine Resources, University of Washington, Seattle, WA 98196

The purpose of this discussion is to explore the problem of high cost of insurance coverage for fishing vessels in order to discover to what extent it causes and is caused by other problems, and to examine and evaluate several possible methods of resolution. The author concludes that without restrictions on additional entry into a fishery, no relief from high fishing costs can be lasting. Therefore, any solution to the problem of high insurance costs must include limited entry.

The author compares the insurance problem with the problem of high cost of insurance coverage for fishing vessels in order to discover to what extent it causes and is caused by other problems, and to examine and evaluate several possible methods of resolution. The author concludes that without restrictions on additional entry into a fishery, no relief from high fishing costs can be lasting. Therefore, any solution to the problem of high insurance costs must include limited entry.

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Hall, Carl W., A. W. Farrall, and A. L. Rippen  
Published by the Avi Publishing Co. Inc., P.O. Box 670, Westport, CT 06880 (1971),  
vol. 1, 755 pp. Price \$52; \$53 foreign.

Neil H. Mermelstein (reviewer)  
Food Technology 25, No. 12, 93 (1305) (December 1971)

This book is part of the "Encyclopedia of Food Technology and Food Science Series." It contains over 800 entries. It emphasizes the equipment and facilities used in food handling, preparation, and transportation. The book contains more than 300 illustrations and 200 tables.

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This book is the revised and updated edition of the first one published in 1963. Some of the added sections are on nonequilibrium thermodynamics, refrigeration, centrifugation, ultrafiltration or reverse osmosis, column chromatography, and foam separation of soluble components. The book is concerned with the application of engineering principles to foods; it is a valuable book for the food technologist and engineer.

Food Technology 25, No. 12, 93 (1305) (December 1971)

Charm, S. E.  
Published by the Avi Publishing Co. Inc., P.O. Box 670, Westport, CT 06880 (1971),  
2nd Ed., 629 pp. Price \$29 U.S., \$30 foreign.

Neil H. Mermelstein (reviewer)

## 9.6 (0.8) FUNDAMENTALS OF FOOD ENGINEERING

"The Role of Litigation in Environmental Policy: The Power Plant Siting Problem,"  
by David Sive (Winer, Neuburger & Sive, New York, N.Y.), pp. 497-477.

"The Bureaucratic Response to Environmental Law," by Geoffrey Wandesforde-Smith  
University of California, Davis, Calif., pp. 479-488. [34 footnotes]

"Environmental Policy: Public Participation and the Open Information System," by  
Harvey Frauenglas (Environmental Reporter Foundation, Albuquerque, N. Mex.),  
pp. 467-466. [11 footnotes]

"Public Participation and Environmental Quality," by Arnold W. Bolle (School of  
Forestry, University of Montana, Missoula, Mont.), pp. 497-505. [11 foot-  
notes]

"International Environmental Management: Some Preliminary Thoughts," by Thomas  
W. Wilson, Jr. (International Institute for Environmental Affairs, Wash-  
ington, D.C.), pp. 508-512. [1 footnote]

"Environmental Policy and International Institutional Arrangements: A Proposal  
for Regional and Global Environmental Protection Agencies," by Albert E.  
Utton (School of Law, University of New Mexico, Albuquerque, N. Mex.), pp.  
513-515. [12 footnotes]

FTP

Bachanek, Stanislaw (Zakl. Ochr. Wod, Gdansk, Poland)  
Chemical Abstracts 75, No. 26, 154800w (December 27, 1971)

## 0.8 INVESTIGATIONS ON PHYSICOCHEMICAL COMPOSITION OF FISH INDUSTRY WASTE WATERS

Libicki, Samuel (University of Chicago Law School, Chicago, Ill.) Edited by Walter  
C. Clements, Roy H. Olson, and Bruce L. Simpson.  
Limnos 4, No. 3, 1-36 (Fall 1971)

This is a report of a research study into the basic law of water rights from  
the old English law to modern times, with particular attention to important Amer-  
ican fresh water decisions in the Midwestern States (does not include statutes or  
decisions interpreting legislation). The price of the individual report is \$5.00  
and may be obtained from the Great Lakes Foundation, 2200 North Campus Blvd., Ann  
Arbor, MI 48105.

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[19 references]

In this article, the author discusses the present situation relative to the  
law of the sea and suggests several possible grounds for compromise for seeking  
agreement on some of the controversial issues.

Padelford, Norman J. (Ocean Engineering Department, Massachusetts Institute of  
Technology, Cambridge, Mass. 02139)  
Sea Grant Project Office, Report No. MITSG 72-5 (Index No. 72-605-Npe), Massa-  
chusetts Institute of Technology, 13 pp. (November 1, 1971)

## 9.3 PROSPECTS FOR A NEW REGIME OF THE SEAS: INTERNATIONAL POLITICAL CONSIDERATIONS

### ECONOMIC CONDITION OF SELECTED PACIFIC NORTHWEST SEAFOOD FIRMS

Smith, Frederick J. (Department of Agricultural Economics, Oregon State University,  
Corvallis, OR 97331)  
Special Report 327, OSU Sea Grant, 14 pp. (September 1971) (Agricultural Experi-  
ment Station, Oregon State University, Corvallis, OR 97331)

Pacific Northwest fishermen operate competitive, small, independent firms  
under varying and frequently conflicting regulations. They must deal with small,  
isolated, high-cost gear and vessel repair and supply firms and with strong inde-  
pendent and/or corporate seafood processors. Pacific Northwest fishermen are  
looked upon as high-risk, low-return businesses by lenders and insurance firms.

Returns to management for nine above-average composite Northern California,  
Oregon, and Washington vessels range from \$-15,842 to \$3,021. Returns to labor  
and management range from \$-4,462 to \$22,207, and returns to labor, management,  
and investment range from \$2,032 to \$27,081. These returns are generally higher  
than for longliners, trawlers, draggers, and seiners operating in the northwest  
Atlantic and generally lower than returns to Georgia shrimp vessels.

Opportunities for improving the economic condition of fishing firms exist  
through better cost control of such items as gear repair, vessel repair, and in-  
surance and through greater efficiency (catch/unit effort). Price increases may  
prove beneficial with appropriate improvements in controlling total resource ex-  
ploitation and improved understanding of demand elasticity.

Processors and distributors operate under less complicated state and federal  
regulations, but must contend with variable raw product supplies, raw  
product quality, unionized but relatively immobile labor and an unpredictable  
retail market.

Opportunities for improvement appear to include better control of raw product  
purchasing and increased efficiency of labor.

Extract of author's summary

[see tables, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100]



Craven, John P. (Department of Ocean Engineering, University of Hawaii, Honolulu, Hawaii 96822) (Compiled and edited by T. Gray Curtis, John R. Mittleman, and James M. Patell)  
Massachusetts Institute of Technology, Sea Grant Project GH-88, 525 pp. (1971) (The M.I.T. Press, Cambridge, MA 02142)

The material in this manual was developed for a course entitled "Ocean Engineering Systems" as part of the Ocean Engineering Program of the Department of Naval Architecture and Marine Engineering Program at the Massachusetts Institute of Technology (MIT). The case studies, appearing in each of the eight chapters of the report, were prepared by MIT students as part of their course requirements. Pertinent chapters and case studies are as follows.

- Chapter I. "Ocean Engineering Systems." Case Study: "Mission Profile," by E. S. McGinley, II
- Chapter II. "Platforms." Case Study: "A Disaster-Relief System (A First Iteration)" by Charles N. Calvano and Bruce Luxford.
- Chapter III. "Life Support Subsystem." Case Study: "The Establishment of Tolerance Levels and Forecasting Procedures for the Influx of Pollutants onto the Continental Shelf Areas Adjacent to the Major Rivers of North America," by Ronald C. Gullarte.
- Chapter VII. "Environmental Sensing and Control Subsystem." Case Study: "Shore Protection System--Environmental Sensing and Control." by John R. Mittleman.
- Chapter VIII. "Logistic Support and Maintenance." Case Study: "Nonpollutive Power System," by L. K. Donovan.

3.11 JELLIED FISH PRODUCT

Takeda Chemicals Inds. Ltd. (pat.)  
Japanese Patent 18587/71  
Food Technology 25, No. 11, 118 (November 1971)

A salt of a stearyl fumaric monoester or of a higher fatty acid ester of lactic acid is added to jellied fish products to improve their gel strength. FTP

3.11 FISH PASTE PRODUCT

Ajinomoto Inc. (pat.)  
Japanese Patent 18590/71  
Food Technology 25, No. 11, 118 (November 1971)

Polyvinylpyrrolidone is added to fish paste products prior to cooking in order to improve the keeping quality of the fish paste. FTP

Hasa, Gerhard J. (Woodcliff Lake, N.J.); assignor to General Foods Corp., White Plains, N.Y. (pat.)  
U.S. Patent 3,623,884  
Food Technology 25, No. 11, 118 (November 1971)

3.11 ANIMAL FOOD PRODUCTS

3.237 FISH PREPARATION METHOD

Malin, Denis J. (Columbus, Ohio); assignor to Arthur Treacher's Fish & Chips, Inc., Columbus, Ohio (pat.)  
U.S. Patent 3,622,348  
Official Gazette of the U.S. Patent Office 892, No. 4, 1419 (November 23, 1971)

Raw frozen fish (at a temperature below 0° F.) are tempered in a refrigerator until they reach a uniform temperature of 25° F. Then, the fish are cut into serving portions, and the portions are battered and breaded, and deep fat fried. FTP

3.237 AUTOMATIC CARTONING OF FISH FINGERS

Anonymous

Food Manufacture 46, No. 10, 47, 49, 51 (October 1971)

This article describes a fully automatic fish finger [fish stick] unscrambling, collating, and cartoning line capable of packing fish sticks in cartons of up to 185 cartons per minute. [1 illustration] FTP

Kyokuto Sangyo K.K. (pat.)  
Japanese Patent 16940/71  
Food Technology 25, No. 11, 118 (November 1971)

Earlier reports [B. F. Medwadowski, J. Van der Veen, and H. S. Olcott, J. Food Sci. 32, 361-365 (1967) and JAOS 45, 709-710 (1968)] have described the nature of the residual lipids in fish protein concentrates (FPC) prepared from red hake and from Atlantic menhaden by isopropanol extraction. In the present article, the authors report the effects of storage of three different FPCs for 6 months at 37°C. and at 50°C. on their extractable lipids. The FPCs were made from pout, alewife, and Gulf menhaden.

FISH PROTEIN CONCENTRATE

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Medwadowski, Barbara, Alleah Haley, John Van Der Veen, and H. S. Olcott (Institute of Marine Resources, Department of Nutritional Sciences, University of California, Berkeley, CA 94720)  
Journal of the American Oil Chemists' Society 48, No. 12, 782-783 (December 1971)

When the amount of extractable lipid was 0.1% or less (in the FPCs from pout and alewife) there were only small changes in the lipid pattern--a small decrease in the amount of neutral lipid-free fatty acid fraction and larger decreases in the long chain, unsaturated fatty acids. In the Gulf menhaden FPC sample (containing residual lipid of about 0.5%), the amount of extractable lipid decreased after storage of the FPC for 6 months at 37° C. and 50° C. The extractable lipids in the menhaden FPC (after 6 months of storage) showed decreases in the neutral lipids plus free fatty acid fractions and decreases in the long chain, unsaturated fatty acids. [2 tables, 6 references]

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Preston, Alan	23	9.19	Thorslund, Anders E.	12	4.92			
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Raven, Peter H.	25	9.2	Tsuji, Hikoji	14	7.591			
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Sawada, Jiro	11	4.21	Varshavsky, J.A. M.	3	0.5			
Sawicki, Jan	10	3.12	Vinogradov, M. E.	8	2.1113			
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Shaw, Stanton B.	16	7.80	Von Brandt, A.	26	9.3			
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Shelton, R. G. J.	5	0.8	Wandesforde-Smith, Geoffrey	7	2.01			
Sherwood, R. J.	9	3.249	Wedemeyer, Gary A.	14	7.52			
Shewfelt, A. L.	18	9.13	Welcomme, Robin L.	14	9.11			
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Shimma, Yaichiro	22	9.16	White, R. W.	2	0.110			
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Sidwell, V. D.								



## COMMERCIAL FISHERIES ABSTRACTS

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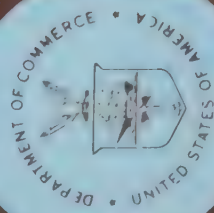




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Seattle, Wash.





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Frank T. Piskur  
Editor



Dea, Phoebe, Sunney I. Chan (Noyes Laboratory of Chemical Physics, California Institute of Technology, Pasadena, CA 91109), and Frank J. Dea (Department of Clinical Pharmacology and Pharmacokinetics, University of Southern California, Los Angeles, CA 90033)  
Science 175, No. 4018, 206-209 (January 14, 1972)

This article is a report of a 220-Mhz proton magnetic resonance study of an isolated rabbit sciatic nerve in its native state. The results indicate that the sciatic nerve contains hydrophobic regions that are sufficiently fluid to give a high-resolution PMR spectrum. The authors attribute these liquidlike hydrophobic regions to the fatty acid side chains of the phospholipids of the nerve. These observations are in agreement with the results of recent electron spin resonance spin-labeled studies of excitable membranes of nerve and muscle.

[3 figures, 9 references]

Iyengar, J. R., and D. P. Sen (Cent. Food Technol. Res. Inst., Mysore, India)  
Chemical Abstracts 74, No. 7, 30832t (Feb. 15, 1971)

0.37  
(3.5)(3.12)  
EQUILIBRIUM RELATIVE HUMIDITY RELATION OF SALTED FISH (BARBUS CANATICUS AND RASTRELLIGER CANAGURTA): EFFECT OF THE CALCIUM AND MAGNESIUM AS IMPURITIES IN COMMON SALT USED FOR CURING

0.38 MIXED FUNCTION OXIDASE ACTIVITY IN FRESHWATER FISHES: ALDRIN EPOXIDATION AND PARATHION ACTIVATION

Ludke, J. Larry, James R. Gibson, and Christina I. Lusk (Department of Zoology, Mississippi State University, State College, MI 39762)  
Toxicology and Applied Pharmacology 21, No. 1, 88-98 (January 1972)

These experiments demonstrate that fresh-water fishes possess mixed function oxidase enzymes which catalyze the epoxidation of aldrin and the activation of parathion in vivo. These reactions probably occur in the liver because aldrin accumulates rapidly in the liver and is followed by simultaneous decrease in aldrin and increase in diolaldrin. Mixed function oxidase inhibitors, sesamix (methylene dioxyphenyl compound) and SKF525A(N-alkyl compound), antagonized parathion activation and toxicity, and antagonized only the epoxidation of aldrin. There is a mutual antagonism between parathion and aldrin in which simultaneous treatment reduces the metabolism of both compounds.

The authors suggest that the mixed function oxidase system in fish is a new pathway for the metabolism of xenobiotics and that it may be involved in the detoxication of many environmental pollutants. Further, the present findings indicate that the mixed function oxidase system is not necessarily an activation.

[2 figures, 7 references]

0.38 PANCREATIC TRYPSINOGEN FROM THE AFRICAN LUNGFISH  
Reeck, Gerald R., and Hans Neurath (Department of Biochemistry, University of Washington, Seattle, WA 98105)  
Biochemistry 11, No. 4, 503-510 (February 15, 1972)

Trypsinlike enzymes from lower vertebrates, invertebrates, and microorganisms have been discovered and characterized during the past few years. These include pancreatic trypsin from the dogfish, and trypsinlike enzymes from the starfish, shrimp, sea pansy, horseshoe crab, crayfish, moth, and a bacterium, *Streptomyces griseus*. Apparently, the amino-acid compositions and molecular weights of these proteins are similar to those of bovine trypsin (23,000). The possibility exists that the sequences of many, if not all, of the trypsins listed are homologous to those of the vertebrate trypsins. Earlier, G. R. Reeck, W. P. Winter, and H. Neurath [Biochemistry 9, 1398 (1970)] reported on the chromatographic analysis of the major enzymes and zymogens in the pancreas of African lungfish (*Protopterus aethiopicus*), identifying three separate chromatographic fractions containing trypsinogen. In the present study, one of these fractions was purified and characterized, and was related to the evolutionary pattern of trypsins.

The purified pancreatic trypsinogen from the African lungfish was characterized by molecular weight, amino-acid composition, amino-terminal sequence, and by activation. The activation peptide of the zymogen has the sequence Phe-Pro-Ile-Glu-Lys-Asp-Lys and differs from all previously known trypsinogens in lacking a tetrapeptide sequence. The authors present a scheme for the evolutionary changes in the structure of the activation peptide of trypsinogen.

[6 figures, 5 tables, 5 references]

83.0 A FLUORESCENT MODIFICATION OF ADENOSINE TRIPHOSPHATE WITH ACTIVITY IN ENZYME SYSTEMS: 1, N<sup>6</sup>-ETHENOADENOSINE TRIPHOSPHATE

Secrist, John A., III, Jorge R. Barrio, and Nelson J. Leonard (School of Chemical Sciences, University of Illinois, Urbana, IL 61801)  
Science 175, No. 4022, 649-649 (February 11, 1972)

Adenosine triphosphate (ATP) is the universal stoichiometric coupling agent between metabolic sequences and it also acts as a regulatory modifier of these sequences [Atkinson, *Adv. Enzyme Regul.* 6, 202-261 (1967)]. The present paper reports the synthesis of a highly fluorescent analog of ATP (1, N<sup>6</sup>-ethenoadenosine triphosphate) by reaction of ATP with chloroacetaldehyde, and describes the fluorescence properties of the analog and its behavior with several enzyme systems. It appears to be a valuable probe of enzymic mechanism and structure.

[1 table, 1 reference]

0.38 GLYOXYLATE CARBOXY-LYASE ACTIVITY IN THE UNICELLULAR GREEN ALGA *GLOEOMONAS SPECIES*  
(6.3)  
Badour, S. S., and E. R. Waygood (Dep. Bot., Univ. Manitoba, Winnipeg, Manitoba, Canada)  
Chemical Abstracts 75, No. 25, 147949y (Dec. 20, 1971)





0.5	<p>SURVIVAL OF <i>VIBRIO PARAHAEVOLYTICUS</i> IN SHRIMP TISSUE UNDER VARIOUS ENVIRONMENTAL CONDITIONS</p> <p>Vanderzant, C., and R. Nickelson (Animal Science Department, Texas A&amp;M University, College Station, TX 77843) Applied Microbiology 23, No. 1, 34-37 (January 1972)</p> <p>This article contains information on the survival of <i>Vibrio parahaemolyticus</i> in shrimp tissue under various environmental conditions (pH and temperature). <i>V. parahaemolyticus</i> culture 0 from Gulf Coast shrimp was inoculated into whole shrimp and homogenate of shrimp and the samples were stored at various temperatures (3°, 7°, 10°, -18° C.). The effect of pH was determined on the shrimp homogenates at pH values of 5, 6, 7, 8, 9, and 10.</p> <p>Large decreases in the viable population of the organism occurred during storage of the samples for 2 days at 10° to -18° C.; however, survivors were present even after 8 days. The researchers found no significant differences in the population changes of the inoculated whole shrimp as compared with the population changes of the inoculated shrimp homogenates.</p> <p><i>V. haemolyticus</i> was very sensitive to the pH value of 5.</p> <p>[4] figures, 7 references]</p> <p>FTP</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 3</p>
0.5	<p>SOME OBSERVATIONS ON THE MICROFLORA OF DISPOSABLE PAPER HAND-WIPES</p> <p>Koburger, John A., and Robert M. Lapin (Department of Food Science, University of Florida, Gainesville, FL 32601) Journal of Milk and Food Technology 35, No. 1, 30-31 (Jan. 1972)</p> <p>Thirty-eight samples of disposable paper hand towels and napkins were checked for their microbial content. Fifty percent of the samples had bacterial counts of &lt; 100 organisms per gram; the rest of the samples had bacterial counts of up to 7,200 per gram. The flora consisted mainly (about 90%) of <i>Bacillus</i> species with the remainder of actinomycetes, clostridia, micrococci, molds, and diphtheroids. <i>Bacillus cereus</i> was found in five of the samples. The authors conclude that the microbial quality of disposable paper hand-wipes was good. However, they add, the hand-wipes are not sterile and caution should be practiced when these products are used in contact with foods.</p> <p>[1] table, 3 references]</p> <p>FTP</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 3</p>

0.5	<p>NUMERICAL TAXONOMY OF <i>CORYNEFORM</i> BACTERIA ISOLATED FROM POND-REARED SHRIMP (<i>PENAEUS AZETECUS</i>) AND POND WATER</p> <p>Vanderzant, C., P. W. Judkins, R. Nickelson, and H. A. Fitzhugh, Jr. (Animal Science Department, Texas A&amp;M University, College Station, TX 77843) Applied Microbiology 23, No. 1, 38-45 (Jan. 1972)</p> <p>By use of numerical taxonomy, the researchers (1) compared characteristics of <i>coryneforms</i> from pond shrimp and pond water with those of type cultures of <i>Corynebacteriaceae</i> and (2) developed a classification for the pond isolates based on biochemical and physiological characteristics.</p> <p>The pond isolates could be placed into six major groups based on certain biochemical and physiological tests. The <i>coryneform</i> microorganisms isolated from shrimp and water showed little similarity to the type cultures. The authors suggest that the pond isolates are probably members of the <i>Corynebacteriaceae</i> not previously studied in detail.</p> <p>[6 figures, 4 tables, 7 references]</p> <p>FTP</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 3</p>
0.32	<p>PHYSICO-CHEMICAL BEHAVIOR OF FISH MEAT PROTEINS.</p> <p>I. BEHAVIOR OF PROTEIN POLYPEPTIDE CHAINS DURING SETTLING OF FISH MEAT PASTE</p> <p>Niwa, Eiji, and Masato Miyake (Fac. Fish., Prefect. Univ. Mie, Tsu, Japan) Chemical Abstracts 76, No. 1, 2655k (Jan. 3, 1972)</p> <p>II. Reactivities of Polypeptide Chain Side Groups During Settling of Fish Meat Paste. Ibid. 2654j.</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 3</p>
0.6	<p>MARINE FOOD TECHNOLOGY</p> <p>[TECHNOLOGIA ŻYWNOSCI POCHODZENIA MORSKIEGO]</p> <p>Sikorski, Z. E. Published by Wydawnictwa Naukowo-Techniczne, Warszawa (December 1971), Contains 574 pp., 93 tables, and 315 illustrations. Price 100 Polish zloty. (In Polish)</p> <p>The author, chairman of the Department of Fish Technology of the Technological University Politechnika Gdanska, prepared a textbook based on up-to-date research findings and industrial achievements. It covers, in 14 chapters, the entire field of marine food technology. A main purpose of the book was to illustrate how fundamental physical, chemical, and biochemical phenomena occurring in the processed or stored raw material influence the final quality of the products.</p> <p>The book contains the following chapters:</p> <ol style="list-style-type: none"> <li>1. "The biological and technical fundamentals of the production of foods from the seas." 62 pp. [46 illustrations, 7 tables, and 48 references]</li> <li>2. "The chemical composition of main marine foods." 48 pp. [14 illustrations, 15 tables, and 88 references]</li> <li>3. "Technological characteristic of marine foods." 63 pp. [37 illustrations, 3 tables, 85 references]</li> <li>4. "Mechanical processing of fish." 21 pp. [24 illustrations, 6 tables, 17 references]</li> <li>5. "Refrigeration and cold storage of fish." 36 pp. [19 illustrations, 8 tables, 47 references]</li> <li>6. "The freezing preservation of marine foods." 70 pp. [45 illustrations, 10 tables, and 136 references]</li> </ol> <p>(over)</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 3</p>

0.5 (2.3) MICROBIAL FLORA OF PACIFIC OYSTERS (CRASSOSTREA GIGAS) SUBJECTED TO ULTRAVIOLET-IRRADIATED SEAWATER

Vasconcelos, G. J., and J. S. Lee (Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331)  
Applied Microbiology 23, No. 1, 11-16 (Jan. 1972)

The researchers tested the ability of oysters to purge themselves of microbial contaminants by identifying the microorganisms retained by the oysters after they had been subjected to ultraviolet (UV) light-treated sea water. Pacific oysters were used. The oyster purification system consisted of thirteen 30-watt germicidal (UV) lamps arranged in linear configuration; each lamp emitted almost 253.7-nm. radiation. The test aquarium received irradiated sea water and the control aquarium received nonirradiated sea water. The flow of the irradiation treated sea water was such that it received a UV intensity of 960 µw. per cm.<sup>2</sup>. The UV light reduced the microbial count of sea water from 263 to 13 per ml. and the coliform multitube test (MPN) was reduced from a high of 17 to < 0.18 per 100 ml. Most (over 75%) of the microorganisms in the treated sea water were Acinetobacter, Moraxella, Vibrio/Pseudomonas type II, and Flavobacterium/Cytophaga.

The microbial composition (except for the coliforms) of the oysters held in the light-treated sea water remained at levels comparable to that of the oysters held in untreated sea water. Total counts of the oysters ranged from 10<sup>3</sup> to 10<sup>7</sup>/g. Most (over 90%) of the microorganisms in the oysters consisted of Flavobacterium/Cytophaga, Vibrio/Pseudomonas type II, Pseudomonas type IV or IV, Acinetobacter/Moraxella, gram-positive cocci and Bacillus. Only some samples contained coagulase-positive, deoxyribonuclease-positive, and beta-hemolytic cocci, V. parahaemolyticus, V. alginolyticus, and Aeromonas species.

FTP 3 figures, 4 tables, 13 references

5.0 AQUATIC AND MARINE MICROORGANISMS, INTERRELATIONSHIPS IN ENRICHMENT CULTURES

Ordal, Erling J. (Univ. Washington, Dept. of Microbiology, Seattle, Wash.)  
Final Technical Rept., 16 Oct 68-30 Jun 70, Contract N00014-67-6-0103-0006, 20 pp. (October 1971)  
Available from the National Technical Information Service, Operations Division, Springfield, VA 22151. Order No. AD-731 731 009; FC\$3.00; MF\$0.65.

Government Research Announcements 65, 62, No. 17, December 1961, 01

The method of steady-state enrichment cultures was applied to the study of marine microorganisms. Steady-state enrichment cultures were employed to determine the range of organic compounds used by Sphaerotilus. Cultures grown on glucose and mineral salts grew well in enrichment cultures but failed to grow in pure culture unless vitamins were added. It was concluded that associated bacteria were providing the necessary vitamins for growth of Sphaerotilus. A group of marine vibrios isolated from diseased salmon and herring were investigated by several methods. Strains of Vibrio anguillarum from the Pacific Northwest were closely related to strains from Scotland and Denmark, a number of other vibrios related to strains from Alaska and the North Atlantic were also related to strains from Scotland and Denmark.

(Author)

McPhee, Archie D., and Norman L. Brown (Natl. Cent. Fish Protein Con., Mar. Fish. Serv., College Park, Md.)  
Chemical Abstracts 75, No. 26, 153220v (December 27, 1971)

Printed

0.8 (0.12) (6.54) POWER CONSUMPTION IN SOLID-LIQUID SLURRIES

McPhee, Archie D., and Norman L. Brown (Natl. Cent. Fish Protein Con., Mar. Fish. Serv., College Park, Md.)  
Chemical Abstracts 75, No. 26, 153220v (December 27, 1971)

0.6 (9.6)

7. "The salting and marinading of fish." 30 pp. [15 illustrations, 4 tables, 37 references]

8. "The smoke curing technology of fish." 44 pp. [24 illustrations, 7 tables, 87 references]

9. "Drying of fish and the production of marine protein concentrates." 28 pp. [7 illustrations, 7 tables, 44 references]

10. "The canning of fish." 65 pp. [42 illustrations, 9 tables, 39 references]

11. "The production of fish sausages." 22 pp. [14 illustrations, 1 table, 32 references]

12. "The radiation preservation of marine foods." 20 pp. [9 illustrations, 2 tables, 40 references]

13. "The fishery by-products technology." 35 pp. [13 illustrations, 13 tables, 57 references]

14. "Technological designing of fish processing plants." 11 pp. [6 illustrations, 1 table, 7 references]

The book is also provided with a thoroughly prepared index.

Abstract contributed by Edward A. Dunajski

FTP The mechanism drives the peeling rollers of a shrimp peeling machine and the peessure finger frames mounted thereover.

Official Gazette of the U.S. Patent Office 893, No. 2, 415 (Dec. 14, 1971)

U.S. Patent 3,626,551

Lapeyre, James M.; assignor to Laitram Corp., New Orleans, La. (pat.)

0.8 SHRIMP PEELING MACHINE DRIVE MECHANISM

Vanderzant, C., and R. Nickelson (Animal Science Department, Texas A&M University, College Station, TX 77843)

Applied Microbiology 23, No. 1, 26-33 (Jan. 1972)

In certain areas, Vibrio parahaemolyticus is responsible for the majority of food borne gastroenteritis. The purpose of the present study was to evaluate the criteria now used for presumptive identification of V. parahaemolyticus and to determine the fewest and most reliable characteristics for identification and (2) to develop a rapid and reliable method for the isolation and enumeration of V. parahaemolyticus. The present authors report information on the isolation, identification, and public health significance of V. parahaemolyticus in a review in the Journal of Milk and Food Technology (in press). With their procedure, a satisfactory quantitative recovery of known V. parahaemolyticus from inoculated seafoods was possible.

FTP 7 tables, 15 references

5.0 PROCEDURE FOR ISOLATION AND ENUMERATION OF VIBRIO PARAHAEOMOLYTICUS

Vanderzant, C., and R. Nickelson (Animal Science Department, Texas A&M University, College Station, TX 77843)

Applied Microbiology 23, No. 1, 26-33 (Jan. 1972)

In certain areas, Vibrio parahaemolyticus is responsible for the majority of food borne gastroenteritis. The purpose of the present study was to evaluate the criteria now used for presumptive identification of V. parahaemolyticus and to determine the fewest and most reliable characteristics for identification and (2) to develop a rapid and reliable method for the isolation and enumeration of V. parahaemolyticus. The present authors report information on the isolation, identification, and public health significance of V. parahaemolyticus in a review in the Journal of Milk and Food Technology (in press). With their procedure, a satisfactory quantitative recovery of known V. parahaemolyticus from inoculated seafoods was possible.

FTP 7 tables, 15 references

Future articles will cover specific sanitary equipment design of food processing equipment.

Curators making equipment to meet these standards, and illustrations and descriptions of food processing equipment that emphasizes good sanitary design.

(illustrated)

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(illustrated)



# SAFETY EVALUATION OF YEAST GROWN ON HYDROCARBONS. III. TWO-YEAR FEEDING AND MULTIGENERATION STUDY IN RATS WITH YEAST GROWN ON GAS OIL

De Groot, A. P., H. P. Til, and V. J. Feron (Central Institute for Nutrition and Food Research, TNO, Zeist, Netherlands)  
Food and Cosmetic Toxicology 9, No. 6, 787-800 (Dec. 1971)

This paper is a report of a 2-year study of rats fed diets containing protein concentrate from yeast produced by the gas oil process. The yeast was fed to rats at dietary levels of 10, 20, or 30% for 2 years. Two control diets were used; the first was similar to the yeast diets but contained soybean-oil meal instead of the yeast, and the second was the Institute's stock diet. The multigeneration study showed no effect of the yeast diet on fertility, lactation performance, or embryonic and preweaning mortality. The authors concluded that the yeast examined did not cause any deleterious effects in rats.  
[Parts I and II of this series of reports were published in the same journal, vol. 8, page 267 and page 499 (1970).]  
[9 tables, 7 references]

FTP

Chemical Abstracts 75, No. 13, 87157b (Sept. 27, 1971)

Olsansky, Cestmir, Vladimír Šimáček, Josef Karafiát, Karel Pazderský, Miroslav Bleha, and Jitka Kohlová (Vychodoecké Mlék. n.p., Pardubice, Czechoslovakia)

## PRODUCTION OF A MILK PROTEIN CONCENTRATE

9.0

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 5

# COMPARATIVE EVALUATION OF BIOLOGICAL TYPE FOOD PROCESSING LIQUID WASTE DISPOSAL SYSTEMS

Wilson, John M., B. A. Twigg, and A. Kramer (Dept. of Horticulture, Maryland Univ., College Park, MD 20740)  
Rept. for Jul 65-Jun 71, 107 pp. (June 1971) W71-13308 OWRR-A-005-MD(4). Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151; Order No. PB-203 068, PC\$3.00 MF\$0.95.  
Government Research Announcements 71, No. 22, 130-131 (November 25, 1971)

Food Processing plants have the capability of discharging up to 36 billion gallons of waste water annually. This liquid waste must be disposed of in a manner which decreases its strength to a level required by water regulatory agencies. Several variations of lagoon type biological systems using two lagoons in series have been investigated over a two-year period. The results indicate that the semi-anaerobic-aerated and the forced aerated systems merit further consideration as efficient disposal methods. The open or facultative system serves only as a dumping place with settling as the primary treatment process. The BOD/COD relationships were studied and variations from the ratios reported in the literature were observed. In the anaerobic and open systems the BOD/COD ratios were approximately 1.0 or greater. In the forced aeration units the ratio was considerably less than 1.0. The possibility exists that these values could be of assistance in determining the conditions of the lagoon.

Reprinted

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 5

# TRAWLING RESOURCES ON THE NORTH-ATLANTIC CONTINENTAL SLOPE

Pechenik, L. N., and F. M. Troyanovskii (Northern Fishing Reconnaissance, U.S.S.R.)  
Perovskoi 2, Murmansk, U.S.S.R.)  
Main Administration of the Fishing Industry, Northern Basin, Northern Fishing Reconnaissance, Murmansk, (1970), iv + 66 pp. [Translated by E. Vilim and H. Mills, Israel Program for Scientific Translations, Ltd.] Available from the U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22151.

This booklet describes the results of exploratory fishing in regions of the North Atlantic continental slope carried out during 1963 to 1968 by vessels of the Northern Fisheries Reconnaissance (U.S.S.R.).

Chapter I gives a brief description of the North Atlantic continental slope; Chapter II describes the zone of the continental slope in the western part of the Barents Sea; Chapter III describes the zone of the continental slopes around Iceland; Chapter IV describes the zone of the continental slope in the regions of the Flemish Cap Bank and northern Newfoundland Bank, and around Labrador and Baffin Island; and Chapter V describes the main features of trawling at great depths, as based on the experiences of the skippers of search and fishing vessels.  
[44 figures, 13 tables, 23 references]

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 5

# COMMERCIAL SEAFOOD INDUSTRY OF OREGON: A COMPARISON WITH OTHER REGIONS OF THE UNITED STATES

Rettig, R. Bruce, and Kenneth J. Roberts (Oregon State University, Agricultural Experiment Station, Corvallis, Oreg.)  
Special Report No. 331, 11 pp. (July 1971) (Sponsored by NOAA, Office of Sea Grant, Rockville, Md.) Available from the National Technical Information Service, U.S. Dept. of Commerce, Sills Bldg., Springfield, VA 22151. Order No. COM-71-01041.  
NOAA Publications Announcement No. 71-20, (71-20-16-02), 4 (December 1971)

This study examines one source of ocean wealth--seafood--in the United States, particularly in the State of Oregon. Section I is directed toward the role of seafood as a means of livelihood. Only employment in catching and processing seafood is described in this study, although harvesting and processing of seafood give rise to many additional jobs in related areas such as fishing gear and financial services. Section II describes the seafood species caught at both the national level (United States as whole) and the regional level. Description of seafood landings is given for all major regions of the United States so that some comparison between Oregon and the rest of the United States can be made. Section III deals with the demand for seafood. The discussion focuses on the forces which lead consumers to value some seafood products more highly than others and to value various seafood products differently than nonseafood products. (NOAA abstract)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 5 PAGE 5



The authors integrated computer simulation, laboratory experiments, and field measurements to determine the dynamics of growth of mixed populations of bacteria associated with the marsh grass *Spartina alterniflora*.

Photos are presented to emphasize the need for hands-on training. (Author)  
Reprinted

Paper presented at Conference of Marine Technology Society, Washington, D.C. (1977)  
pp. 271-287

Benson, Richard C. (Department of Marine Technology, Miami-Dade Junior College,

## 0.9 THE MARINE TECHNICIAN - PAST, PRESENT, AND FUTURE

[6 figures. 4 illustrations]

help solve recycling problems, (6) the public and recycling, and (7) reaching re-

PROCEEDINGS OF THE FIRST NATIONAL CONFERENCE ON COMPOSTING--

1.120

A thorough knowledge of food and feeding habits of tuna is important to an understanding of the biology, abundance, and distribution of tuna species.

and western tropical and subtropical Atlantic Ocean in 1965 and 1966. Fish, mol-

Fish was the predominant forage volumetrically throughout the Atlantic Ocean and numerically in the western Atlantic; crustaceans were predominant numerically

When the mean percentages of the three principal sources of tuna food--fish, mol-

mile tunas were eaten by both skipjack and yellowfin tunas.

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0.0  
(9 79)

Answers

Report

Government Research Announcements 71. No. 21. 49 (November 10, 1971)

and the Environment,' presented by the Department of Conferences and Institutes

.....

increase consisted of pond fish  
the total fish production in 1969 was 26,470 kg and in 1970 was 27,000 kg.

[illegible]

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3.332

LOSSES OF NITROGENOUS SUBSTANCES AND WATER SOLUBLE VITAMINS  
IN THE BLANCHING OF FISH

Andrusenko, P. I., and B. L. Nekhankin (Kaliningrad Tekh. Inst. Rybn. Prom. Khoz., Kaliningrad, U.S.S.R.)  
Chemical Abstracts 75, No. 1, 4156b (July 5, 1971)

Printed by the Ministry of Agriculture, U.S.S.R.

Thirteen mould-inhibiting, commercially available paints were tested for their anti-mould activity in the laboratory and in a long-term experiment. The paints were also analysed for heavy metal content to ensure they were suitable for use in food factories. Sixteen food factories. Sixteen food factories.

(1971 June) 777 (In German, English summary)  
Fleischwirtschaft 51, 161-162, 2, 4, 1971  
BfMIRA Abstracts 27, 161-162, 2, 4, 1971  
Mintzlaff, J. H.

TESTING PAINTS WHICH ARE EFFECTIVE AGAINST MOULDS AND STORES  
CAN BE USED IN THE PRODUCTION ROOMS AND STORES  
(1971.2) 61.3

3.336

## HELICAL-PUMP CAN STERILIZER

Rockwell, W. C., and D. F. Farkas (Western Regional Laboratory, U.S. Department of Agriculture, Berkeley, CA 94710)  
Food Technology 25, No. 12, 38, 40, 43 (1250, 1252, 1255) (December 1971)

This article describes continuous can sterilization using a helical-pump hydrostatic system. [4 figures, 1 table, 2 references]

[9] figures  
packs in steam.

This is the second of two articles on retort processing. In the first article, published in the November issue of the journal, the author discussed various types of retort processing and the styles of retorts. In the present article, the author discusses semi-automatic control systems for retorts and he covers the following subject areas: Temperature control during "hold" period; Automatic timing of the "hold" period; Automatic venting; and Automatic pressure control during cooling. In addition, the author discusses water processing systems and processing packs in steam.

Hughes, P. (Taylor Instrument Companies, (Europe) Ltd.)  
Food Manufacture 46, No. 12, 32-33, 35, 47 (December 1971)

SEMI-AUTOMATIC RETORT CONTROL SYSTEMS  
(0.8)

3.33

3.2490

TECHNOLOGICAL ASPECTS OF PROCESSING OF EDIBLE MUSSELS,  
CLAMS, AND CRABS. I. SPOILAGE DURING ICE STORAGE

Chinnamma, P. L., D. R. Chaudhuri, and V. K. Pillai (Cent. Inst. Fish. Technol., Cochín, India)  
Chemical Abstracts 74, No. 19, 98363w (May 10, 1971)

3.2493  
(4.21)  
OXIDATION OF PHOSPHOLIPIDS OF AQUATIC ANIMALS

Hazama, Koichi (Fac. Fish., Hokkaido Univ., Hakodate, Japan)  
Chemical Abstracts 74, No. 1, 1544v (Jan. 4, 1971)

JLT

The mixture is mainly composed of shellfish and flavoring materials are mixed. The mixture is then divided into portions. During the molding process, the mixture is maintained at a temperature below freezing.

(1971 December) 87, 21, No. 52, Agricultural Technology Food  
513, 09, 3, 1971  
(pat.) S. U. S. A. V. A. Partyka, S. U.

SEIWA HISHI FISHES FROZEN  
62.3

3.15

AN INVESTIGATION OF THE POSSIBLE EFFECTS OF INGESTION  
OF RADIOACTIVE FISH AND OF THE NATURE AND BIOLOGY  
OF TOXINS FOUND IN CERTAIN FISHES

Banner, Albert H. (Hawaii Univ., Honolulu, Hawaii)  
Final Report, June 26, 1958-October 31, 1970, Contract AT(04-3)-235, 10 pp. (Apr. 15, 1971)

Nuclear Science Abstracts 25, No. 16, 3890 (August 31, 1971)

JLT

[2] references  
carbons, rather than novel formation of carbonyls.

Earlier workers found volatile carbonyl compounds in irradiated meats and fats. In the present study, the present authors reported from Vienna sausages that they found 2-pentenol in the distillate from Vienna sausages (1971.2) 6859. In the present study, cooked pork fat was irradiated with  $\gamma$ -rays and the volatile carbonyl compounds were determined spectroscopically after they had been converted to 2,4-dinitrophenylhydrazones. The authors found that the main volatile carbonyl compounds were 2-pentenol and 2-pentenol. The authors found that the main volatile carbonyl compounds were 2-pentenol and 2-pentenol.

(1971 December) 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

PREFERENTIAL LOSS OF CONJUGATED CARBONYL COMPOUNDS  
IN COOKED PORK FAT BY  $\gamma$ -IRRADIATION  
(0.8)

3.15

Morita, Makio, Makoto Tajima, and Masao Fujimaki (Department of Agricultural Chemistry, Faculty of Agriculture, University of Tokyo, Tokyo, Japan)

Agricultural and Biological Chemistry 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991,

### 3.29 NUTRITION OF FROZEN FOODS

Takai, Yuriko, and Yukie Ikegami (Natl. Inst. Nutr., Tokyo, Japan)  
Chemical Abstracts 76, No. 3, 12919p (Jan. 17, 1972)

Unpublished

This report describes the building and the operation of several small fish dry-smoking processing plants in Zambia and it indicates the most suitable designs for the local conditions. The report gives details on the construction of tanks, driers, smoking kilns, and other necessary equipment, and on the numbers of workers needed. It also contains a discussion of the economic aspects.

[unpublished]

El-Dashlouty, M. S., T. M. Dessouki, S. Z. Saied, and Fawzia T. Shenouda (Dep. Horticulture, Minst. Agric., Cairo, U.A.R.)  
Chemical Abstracts 74, No. 23, 123818h (June 7, 1971)

### 3.5 ROLE OF INTERNAL-ORGAN ENZYMES DURING AGING OF SALTED HERRING (0.38)(0.6)

Plorina, A., and A. P. Leonova (U.S.S.R.)  
Chemical Abstracts 75, No. 15, 97357f (Oct. 11, 1971)

### 3.9 HISTOLOGICAL AND BIOCHEMICAL STUDIES ON PECEKH (3.5)

El-Dashlouty, M. S., T. M. Dessouki, S. Z. Saied, and Fawzia T. Shenouda (Dep. Horticulture, Minst. Agric., Cairo, U.A.R.)  
Chemical Abstracts 74, No. 23, 123818h (June 7, 1971)

(unpublished)

This report describes the building and the operation of several small fish dry-smoking processing plants in Zambia and it indicates the most suitable designs for the local conditions. The report gives details on the construction of tanks, driers, smoking kilns, and other necessary equipment, and on the numbers of workers needed. It also contains a discussion of the economic aspects.

### DESIGN, CONSTRUCTION AND ECONOMIC CONSIDERATIONS OF FISH DRY-SMOKING PLANT IN ZAMBIA

(1970)  
(0.12)  
(1.0)

Cabrera, F. J., and K. Watanabe

Ministry of Lands and Natural Resources, Department of Wildlife, Fisheries and Natl. Parks, UN FAO Central Fisheries Research Institute, Zambia (1971)

World Fisheries Abstracts 22, No. 3, 37 (Abstract No. 22-3371) (July-September 1971)

### 3.15 IRRADIATION CLEAVAGE OF TRIMETHYLAMINE OXIDE IN FISH MUSCLE

Amano, Keishi, and Harumi Tozawa (Tokai Reg. Fish. Res. Lab., Min. Agr. Forest., Tokyo, Japan)  
Chemical Abstracts 74, No. 1, 2739z (Jan. 4, 1971)

### 3.15 VOLATILE RADIOLYTIC COMPOUNDS IN IRRADIATED FISH

Barrera Pinero, Rosendo, and Sanchez Luis Gasco (Div. Quim. Nucl., Junta Energ. Nucl., Madrid, Spain)  
Chemical Abstracts 76, No. 3, 12903d (Jan. 17, 1972)

[unpublished]

Soon, Ihm In, Choi Hung Min, and Han Yang Il (Seoul Natl. Univ. Hosp., Seoul, S. Korea)  
Chemical Abstracts 75, No. 1, 4145x (July 5, 1971)

### 3.2495 COMPARATIVE STUDIES ON DISC ELECTROPHORETIC ANALYSIS OF FISH MUSCLE PROTEINS IN STORAGE

Soon, Ihm In, Choi Hung Min, and Han Yang Il (Seoul Natl. Univ. Hosp., Seoul, S. Korea)  
Chemical Abstracts 75, No. 1, 4145x (July 5, 1971)

### 3.2495 CHANGES IN MAJOR AND TRACE ELEMENTS IN FISH MUSCLES DURING STORAGE

Golovkin, N. A., and L. S. Krainova (Leningrad Tekhnol. Inst. Khim. Prom., Leningrad, U.S.S.R.)  
Chemical Abstracts 74, No. 17, 86483x (Apr. 26, 1971)

### CHANGE IN THE FREE AMINO ACID LEVEL IN FROZEN COD DURING LONG-TERM STORAGE

(1971, 1971) b509474, 7, 5, No. 1, 2739z (Jan. 4, 1971)

Vorobeva, T. M., M. E. Yu. Sukhanova (Zaochn. Inst. Sov. Torg., Moscow, U.S.S.R.)  
Chemical Abstracts 75, No. 1, 4145x (July 5, 1971)

### PRELIMINARY OBSERVATIONS ON CHANGES IN NUCLEOTIDES IN OIL SARDINE AND CERTAIN PENAEID PRAWNS DURING CHILL STORAGE

5672.3

### (UNPUBLISHED) KOND YAMB DEISED RADURAD OF SUTIN EGATILIDS

(00.2)  
51.3

(1961) tsungu-lyu 238-138, 5, No. 9, 36 (June 1961)

### (UNPUBLISHED) KOND YAMB DEISED RADURAD OF SUTIN EGATILIDS

(00.2)  
51.3

(1961) tsungu-lyu 238-138, 5, No. 9, 36 (June 1961)



Hirano, Y., and H. S. Olcott (Institute of Marine Resources, University of California, Berkeley, CA 94720)  
Journal of the American Oil Chemists' Society 48, No. 10, 523-524 (October 1971)

The effect of heme compounds on oxidation rates of linoleate emulsions was studied by use of a polarographic oxygen analyzer. The rate of oxidation of linoleate solutions was catalyzed by low levels of heme and heme-proteins and was inhibited by higher concentrations. High concentrations of heme compounds also inhibited lipoygenase catalysis of linoleate oxidation. Salts of manganese and cobalt inhibited heme-catalyzed linoleate oxidation. The authors indicate that these combined effects may reflect the oxidative synthesis of antioxidants from heme compounds. [5 figures, 7 references]

FTL

The nature of the iron complexes that catalyze lipid oxidation is not known. The identification and estimation of the activities of possible nonheme iron catalysts in meat may be a promising area for future research on lipid oxidation in meat. [1 figure, 10 tables, 29 references]

FTP

Kwoh, Theresa Liu (Department of Food and Nutrition, Florida State University, Tallahassee, FL 32306)  
Journal of the American Oil Chemists' Society 48, No. 10, 550-555 (October 1971)

#### 4.5 CATALYSTS OF LIPID PEROXIDATION IN MEATS

11 PAGE 5 ON 52 VOL 52 ABSTRACTS FISHERIES ABSTRACTS

#### 5\* METAL-CATALYZED OXIDATION IN THE PRESENCE OF WATER IN FOODS

Labuza, T. P., Silver, M. Cohn, N. D. Heidelbaugh, and M. Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Journal of the American Oil Chemists' Society 87, No. 10, 135-142 (October 1971)

Model systems were used in which methyl linoleate was oxidized in systems consisting of either cellulose or casein with which lipid was dispersed with water containing cobalt salts.

At low moisture contents, water acts as an antioxidant (through its hydration of metallic catalysts). As the water content increases, the water promotes oxidation (through its solvent activity). Further, in the region of capillary condensation, the antioxidant effect of hydration of metallic catalysts is overshadowed by the prooxidant effect of solubilization of the metallic catalysts. Water soluble chelating agents (EDTA) act on the metal ions in aqueous solutions and the activity of the metals is promoted by increased moisture content.

[References: 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

[References: 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

Noble, Ann C., and W. W. Nawar (Dep. Food Sci. Technol., Univ. Massachusetts, Amherst, Mass.)  
Chemical Abstracts 75, No. 25, 150582d (Dec. 20, 1971)

IDENTIFICATION OF METHYL 4-OXOBUTANOATE  
FROM THE AUTOXIDATION OF METHYL DOCSAHEXAENOATE

11 PAGE 5 ON 52 VOL 52 ABSTRACTS FISHERIES ABSTRACTS

#### 4.15 DOCSAHEXAENOIC ACID OF MARINE ORGANISMS

Hinchliffe, P. R., and J. P. Riley (Dep. Oceanogr., Univ. Liverpool, Liverpool, England)  
Chemical Abstracts 75, No. 21, 127149j (November 22, 1971)

FTL

[4 tables, 52 references]

Data are given on the fatty acids of depot fats of three species of Atlantic marine turtles and six species of North American fresh-water turtles. The marine turtle depot fat was unique in that its depot fats had 6.5% lauric acid, possibly replacing palmitic acid. Only the marine species contained trans-6-hexadecenoic acid. The fresh-water species Dermatemys mawii could be differentiated from the other fresh-water turtles by its fatty acid composition (indicative of a herbivorous diet).

(1961) 776-136, 807  
Comparative Biochemistry and Physiology

Ackman, R. G. S. N. Hooper (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia, Canada), and W. Frair (Biology Department, King's College, Briarcliff Manor, N.Y. 10501)  
Comparative Biochemistry and Physiology

#### 5\* COMPARISON OF THE FATTY ACID COMPOSITION OF DEPOT FATS FROM FRESH-WATER AND MARINE TURTLES

11 PAGE 5 ON 52 VOL 52 ABSTRACTS FISHERIES ABSTRACTS

#### 4.61 FOOD ANTIOXIDANTS AND THEIR INHIBITING EFFECT ON SALTED ATLANTIC HERRING FAT

Pechatina, V. I. (U.S.S.R.)  
Chemical Abstracts 75, No. 15, 97374j (October 11, 1971)

FTL

[11 figures, 11 references]

effect. The nature of the iron complexes that catalyze lipid oxidation is not known. The identification and estimation of the activities of possible nonheme iron catalysts in meat may be a promising area for future research on lipid oxidation in meat. [1 figure, 10 tables, 29 references]

Some handling problems developed when attempts were made to use the spiked-plate freeze drying system of C. Brynko and W. R. Smithies [J. Sci. Food and Agri., 2, 576 (1961)] in existing freeze-drying equipment. The present study was carried out to develop a system that could be used with conventional freeze-drying equipment without modification of the freeze-drier. The authors studied, experimentally, the internal drying problem and developed a mathematical model to evaluate the effect of design parameters on drying rates.

With spiked plates, the overall freeze-drying times can be reduced by as much as 42% as compared with the mathematical model for predicting drying rates was developed from experimental data and it will be useful to the designer of spiked-plate freeze-drying systems. Results obtained using the mathematical model indicated that spike diameter, spike spacing, and plate temperature have significant effect on drying rate, but sample thickness and spike material have no significant effect.

Hatcher, John D., and J. Edward Sunderland (Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC 27607)  
Journal of Food Science 36, No. 6, 899-905 (September-October 1971)

#### SPIKED-PLATE FREEZE DRYING

#### 4.5 THE AUTOXIDATION OF HIGHLY UNSATURATED FATTY ACIDS: METHYL 4,7,10,13,16,19-DOCOSAHEXAENOATE

Noble, Ann C., and W. W. Nawar (Department of Food Science and Technology, University of Massachusetts, Amherst, MA 01002)

The oxidation of highly unsaturated fatty acids is more rapid and more complicated than that of the mono- or diunsaturated acids. In this study, the researchers used methyl docosahexaenoate as a model system for a study of the autoxidation of highly unsaturated fatty acids. The methyl docosahexaenoate was oxidized at 50° C. for 28 hr., and the volatiles were collected by high vacuum distillation and fractionated by gas chromatography. The following compounds were identified: 3-formyl methyl propanoate (C4:0); 4-formyl methyl butanoate (C5:0); 6-formyl methyl 4-hexenoate (C7:1); 5-formyl methyl 4-pentenoate (C6:1); 7-formyl methyl 4,6-heptadienoate (C8:2); 9-formyl methyl nonadienoate (C10:2); 11-formyl methyl dodecatrienoate (C13:3).

12-pentadecatetraenal. Methyl esters: methyl propanoate; methyl 4-hexenoate; methyl nonadienoate; methyl dodecatetraenoate; methyl pentadecatetraenoate; methyl hexadecatetraenoate. Straight chain and cyclic hydrocarbon compounds were present. Three aliphatic hydrocarbons identified were *n*-octadiene, *n*-undecatriene, and *n*-tetradecatetraene. The spectra of the C11:3 and C14:4 hydrocarbons were similar to those of trienes and tetraenes identified earlier in irradiated fats [M. F. Dubravcic and W. W. Nawar, JAOCS **45**, 656 (1968)]

4.12  
WIDE-LINE NMR SPECTRA OF SOME SATURATED AND UNSATURATED  
LONG CHAIN FATTY ACIDS  
Bailey, August V., and Robert A. Pittman (Southern Regional Research Laboratory,  
ARS, U.S. Department of Agriculture, New Orleans, LA 70119)  
Journal of the American Oil Chemists' Society 48, No. 2, 775-777 (December 1971)

This article reports wide-line NMR spectra of a series of long chain fatty acids (decanoic, lauric, myristic, palmitic, stearic, and behenic acids) and of three isostructural unsaturated acids (elaidic, trans-5-eicosenoic, and brassidic acids), including NMR spectra of metastable forms of both the saturated and the unsaturated acids. Apparently, NMR parameters are correlated with carbon chain length, crystal spacing, and density. Also, the polymorphic forms are distinguished on the basis of line width and second moment difference.

monobehendn), [5 figures, 4 tables, 4 references]	FTP
[4 figures, 8 references]	

4.12 THE PHASES OF SATURATED 1-MONOGLYCERIDES C<sub>14</sub>-C<sub>22</sub>  
Lutton, E. S. (Miami Valley Laboratories, Procter & Gamble Co., Cincinnati, OH 45239)  
Journal of the American Oil Chemists' Society 48, No. 2, 778-781 (December 1971).

#### 4.12 THE PHASES OF SATURATED 1-MONOGLYCERIDES C<sub>14</sub>-C<sub>22</sub>

#### 4.5 CALCIUM REQUIREMENT FOR LIPOXYGENASE CATALYZED LINOLEATE OXIDATION

Koch, R. B., Bradford L. Brumfiel, and Mary N. Brumfiel (Honeywell Research Center, Hopkins, MN 55343)

Journal of the American Oil Chemists' Society 48, No. 10, 532-538 (October 1971)

The purpose of this study was to further investigate the  $\text{Ca}^{2+}$  activation of navy bean lipoxygenase and to determine the specificity of calcium for this enzyme activation. This work gives additional evidence that a lipoxygenase does exist that requires the presence of a divalent cation for its activity. [6 figures, 4 tables, 21 references] FTP

FTP

ism is not fully understood. [32 references]

Undesirable changes in the quality of meat and meat products occur as their lipids oxidize and interact with other meat components (pigments and other proteins, carbohydrates, vitamins). Oxidation occurs in the triglycerides and the phospholipids. Ferric heme pigments are major prooxidants in tissue lipid oxidation. Nonheme iron and ascorbic acid may function as prooxidants in meat. Sodium hypochloride accelerates the oxidation of triglycerides but the nature of the mechanism is not fully understood. [32 references]

Love, Jane D., and A. M. Pearson (Food Science Department, Michigan State University, East Lansing, MI 48823)  
Journal of the American Oil Chemists' Society 48, No. 10, 547-549 (October 1971)

4.5 LIPID OXIDATION IN MEAT AND MEAT PRODUCTS--A REVIEW

4.61 ANTIOXIDANT

Hoffmann-La Roche & Co. A.G. (pat.)  
Japanese Patent 16937/71  
Food Technology 25, No. 11, 114 (November 1971)

FTP

**Antioxidant for food consists of a mixture of ingredients.**

[6 figures, 5 references]

COPPER(I) AND COPPER(II) COMPLEXES IN SOLUTION AND THE CRYSTALLINE STATE

Osterberg, R., and B. Sjöberg (Department of Medical Biochemistry, University of Göteborg, S-400 33 Göteborg, Sweden)  
Journal of the American Oil Chemists' Society 48, No. 10, 525-526 (October 1971)

Copper is involved in the development of oxidation defects in fat-containing food products. The copper ions in foodstuffs bound in the form of complexes to nitrogen, oxygen, and sulfur ligand atoms seem to catalyze the oxidation of lipids. The authors are investigating the copper complexes of a series of low molecular weight compounds intended as models for copper protein interaction. The present paper reports on model studies on the copper-protein interaction that may catalyze lipid oxidation using the copper complexes of glycyl-L-histidylglycine and  $\epsilon$ -amino-caproic acid. The compositions of the complexes in solution were measured by emf methods; the structures of the solid complexes were determined by X-ray diffraction techniques. The authors indicate that all the solid complexes have their counterions by species formed in solution.



9.132 (0.5) SANITATION GUIDELINES FOR THE CONTROL OF 'SALMONELLA' IN THE PRODUCTION OF FISH MEAL

Garrett, E. Spencer, and Richard Hamilton (National Marine Fisheries Service, Exploratory Fishing and Gear Research Base, Pascagoula, MS 39567) NOAA-TR-NMFS-CIRC 354, 12 pp. (October 1971) Available from the Government Printing Office, Washington, DC 20402, Stock No. 0320-0023, C55.13:NMFS-CIRC-354; price \$0.25.

Government Research Announcements 71, No. 23, 52 (Dec. 10, 1971)

A detailed description of the scope and magnitude of the *Salmonella* problem as it relates to the manufacture of fish meal is discussed. Specific control steps and procedures are outlined which, if followed, should keep *Salmonella* contamination to a minimum in fish reduction plants.

Reprinted

The recommendations of the Swann Committee are summarized and discussed. Current regulations controlling the use of 16 most commonly used antibiotics in the U.K. and E.E.C. are given in tabular form. L.P.

Reprinted

Bird, D.  
Wild Feeds No. 2, 15-19 (1971)  
BEMIRA Abstracts 24, No. 6, Abstract No. 1858, 384 (June 1971)

6.199 NEW CONTROLS OVER ANTIBIOTICS (IN ANIMAL FEEDS) COME INTO EFFECT IN U.K. AND COMMON MARKET

COMMERCIAL FISHERIES ABSTRACTS 52 VOL 5 PAGE 31

131.9 OIL EXTRACTION FROM VEGETABLE AND FISH SOURCES

Pike, Marshall, and Alan W. Routledge (Albright and Wilson Ltd. and Harrisons and Crosfield Ltd. (pat.))

South African Patent 9,598 (March 30, 1971)  
Chemical Abstracts 76, No. 3, 22968d (Jan. 27, 1972)

Ohoka, Tadaaki, Ryoji Kohira, Masayuki Mizuno, Takaji Kawano (Asahi Chemical Industry Co., Ltd.)  
Chemical Abstracts 75, No. 19, 116002e (November 8, 1971)

6.31 SEA WEEDS WITH HIGH PROTEIN CONTENTS

Imata, Katsu, and Yuichi Saio (Kyowa Fermentation Industry Co., Ltd.) (pat.)  
Japanese Patent 237671 (Jan. 21, 1971)  
Chemical Abstracts 75, No. 19, 116003f (Nov. 8, 1971)

COMMERCIAL FISHERIES ABSTRACTS 52 VOL 5 PAGE 31

4.6 (7.8) TISSUE ANTIOXIDANT EFFECT OF OCEAN HAKE FISH AND FERMENTED SOYBEAN (TEMPEH) AS PROTEIN SOURCES IN RATS

Chen, Linda H., L. V. Packett, and Insun Yun (Department of Nutrition and Food Science, University of Kentucky, Lexington, KY 40506)  
Journal of Nutrition 102, No. 2, 181-195 (February 1972)

The use of tempeh (fermented soybean) to produce a stable, nutritious fish-protein supplement through prevention of lipid autoxidation by the natural antioxidant and as a tissue antioxidant was investigated. Freeze-dried ocean hake fish was mixed with tempeh or soybean. Soybean, tempeh, fish or fish-soybean and fish-tempeh mixtures were used as the sole protein source in diets with or without vitamin E added. Rats were fed 4 weeks, killed and the antioxidant status of the liver, spleen and kidney was determined by using thiobarbituric acid (TBA) assay. Dietary vitamin E reduced TBA values in the liver, kidney and spleen by factors of 11.1, 1.1 and 4.6, respectively. Tempeh did not alter tissue antioxidant status even though earlier studies proved it to contain a potent natural antioxidant. Fish-tempeh or fish-soybean combinations acted synergistically in reducing liver TBA values (10.0 > P > 10.0) below fish, tempeh or soybean alone. Of the tissues tested, liver was the preferred organ for analysis.

Authors' abstract

[3 tables, 13 references]

COMMERCIAL FISHERIES ABSTRACTS 52 VOL 5 PAGE 31

19.4 STUDIES ON THE SHELLFISH PROCESSING. VI. EFFECT OF EDTA AND BHA IN COLOR PRESERVATION OF CANNED SURF CLAM MEAT

Lee, Eung Jong, Bong Ho Han, Yong Gun Kim, and Yeung Ho Park  
Bull. Kor. Fish. Soc. 7, No. 1, 1-7 (1971)  
Korean Scientific Abstracts 3, No. 5, 154-155 (Abstract No. 530/17 October 1971)  
(Korea Scientific and Technological Information Center, 206-6 Cheongryangri-dong, Dongdaemun-ku, I.P.O. Box 1229, Seoul, Korea)

The authors found that pretreatment of surf clam meat with EDTA or BHA helped preserve the color of the canned meat.

The original article contains 1 figure, 1 table, 13 references.

FTD

In Korean

Ascorbic acid plus either butylated hydroxyanisole (BHT) or propyl gallate when added to raw ground beef effectively retarded lipid and pigment oxidation in the beef (packed in oxygen-permeable film) for up to 8 days of refrigerator storage (3° to 5° C.). The additives did not appear to mask the bacterial spoilage of the ground beef. [1 figure, 2 tables, 15 references]

FTF

4.61 RETARDATION OF OXIDATIVE COLOR CHANGES IN RAW GROUND BEEF

Greene, Barbara E., In-May Hsin, and Marylyn W. Zisser (Department of Food Science and Nutrition, Colorado State University, Fort Collins, CO 80521)  
Journal of Food Science 36, No. 6, 940-942 (September-October 1971)

COMMERCIAL FISHERIES ABSTRACTS 52 VOL 5 PAGE 31

FTF

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Bull. Kor. Fish. Soc. 4, No. 1, 22-30 (1971)  
Korean Scientific Abstracts 3, No. 5, 157 (Abstract No. 71/539) (October 1971)

4.61

STUDIES ON THE SHELLFISH PROCESSING VII. EFFECT OF ANTIOXIDANTS OF EDTA TREATMENT ON THE QUALITY OF PRESSED-AND-DEHYDRATED SEA MUSSEL MYTILUS EDULIS

FTP

Dipicolinic acid is used as an antioxidant for fats and oils.

Kyowa Hako Kogyo Co. Ltd. (pat.)  
Japanese Patent 16504/71  
Food Technology 25, No. 11, 114 (November 1971)

## ANTIOXIDANT

time severely depressed the deposition of the <sup>14</sup>C fatty acids. (Author) Reprinted

This study was undertaken to determine comparatively the dietary effect of safflower and menhaden oils on the degree of interaction and deposition of  $\omega_3$  and  $\omega_6$  fatty acids in the brains of growing chicks. The main fatty acids as indicated by gas-liquid chromatography analyses of the lipids in the brains of 1-day-old unfed chicks (obtained from a commercial hatchery) were 16:0, 18:0, 22:6 $\omega_3$ , 18:1 $\omega_9$  and 20:4 $\omega_6$ . The content of each of these fatty acids ranged from 13 to 19 percent. Less prevalent were 22:4 $\omega_6$  and 22:5 $\omega_6$  (each about 5 percent). Three fatty acids of somewhat lower content (1-2 percent) consisted of 18:2 $\omega_6$ , 20:5 $\omega_3$  and 22:5 $\omega_3$ .

Nutrition Reports International 4, No. 1, 19-30 (July 1971)  
NOAA Publications Announcement No. 71-17, 6, Item 71-17-16-06 (October 1971)

Miller, David, Joseph H. Soares, Jr., Susan Cuppett, and Virginia White (NOAA, National Marine Fisheries Service, National Center for Fish Protein Concentrate, College Park, Md. 20740)

4.90  
COMPARATIVE INTERACTION AND DEPOSITION OF  $\omega_3$  AND  $\omega_6$  FATTY ACIDS  
IN CHICK BRAIN (1.23)

#### LIQUIFIED FISH PROTEIN. IV. EXAMINATION OF PROCESSING CONDITIONS FOR INDUSTRIAL PRODUCTION

Iseki, Shigeo, Takehiko Watanabe, Toyosuke Kinumaki (Tokai Reg. Fish. Res. Lab. Tokyo, Japan)  
Chemical Abstracts 74, No. 19, 98377d (May 10, 1971)

6.15 BLEACHING OF FISH MEAT PRODUCTS WITH WATER. III. RECOVERY  
(6.59) OF PROTEINS FROM THE DRAIN PRODUCED IN THE MANUFACTURING  
OF FROZEN FISH MEAT PASTE

Oshima, Hiroshi, and Takayoshi Kawashima (Wakkanai Fish. Exp. Stn., Wakkanai, Japan), *Chemical Abstracts* 74, No. 23, 123813c (June 7, 1971)

oxidizing residual odors. [2 figures]

The description of the new system for reducing fishmeal plant odors is described in this article by G. M. Dreosti (scientific and technical advisor to the Southern African inshore fishing industry) and C. B. Sampson (Engineer for Owenston S. W. Ltd.). The scrubber described is based on a system designed earlier by the Fishing Industry Research Institute, but does not use chlorine gas for

## Anonymous



II. SOLUBILITY AND FRACTIONATION OF PROTEINS]  
ENTWICKLUNG NEUER FISCHMEHLE IN ARGENTINIEN II. LÖSLICHKEIT  
UND FRAKTIONIERUNG DER PROTEINE

Sotorres, A. M., and H. Hörmann (Max-Planck-Institut für Eiweiss- und Lederforschung, München und der Universidad Nacional del Sur, Bahía Blanca, Argentinien)  
Archiv für Fischereiwissenschaft 22, No. 3, 280-286 (December 1971) (In German; summary in English)

The solubilities of the fish protein concentrates prepared from five species of fish in various solvents are shown in the following table:

Solvent	Solubilities of the various fish protein concentrates in percent dissolved				
	Mustelus fasciatus	Raja platana	Cynoscion striatus	Micropogonias barrettoi	Merluccius merluccius
Water	-	-	-	-	-
0.25M NaCl	7.3	6.7	5.6	3.5	5.3
4M urea	23.4	22	22.8	20	21.5
0.1% Na-dodecylsulfate	29.2	29.4	28.8	27.2	36.6

(over)

Salunke, D. K. (Utah State University, Logan, UT 84321), and H. R. Bolin (Western Marketing and Nutrition Division, ARS, U.S. Department of Agriculture, Albany, CA 94710)  
Food Product Development 6, No. 1, 84, 86 (February-March 1972)

A foam-mat drying method developed by the U.S. Department of Agriculture's Western Utilization Research Laboratory was used to prepare dehydrated protein-fortified fruit juices.

Juice, protein, and methyl cellulose combinations were whipped together for 5 min. The foam that resulted was spread 1-millimeter thick on trays and then the film was dehydrated by heating it at 160° F. for 25 min. The dried material was removed and ground to pass through a six-mesh screen and packaged. All operations after the film was dried were carried out in a room with relative humidity below 10%. The powder was packaged in cans sealed under ½-atmosphere pressure. The moisture content of the powder was about 2%. The protein product used contained 62% protein. Products were prepared from apple juice, peach nectar, and cherry juice. Data on the formulation of high protein apple juice is shown in the following table:

(over)

Aldred, John P., James W. Bastian, and Richard R. Kleszynski (Armour Pharmaceutical Co.)  
German Offen. [Patent] 2,118,626 (Oct. 28, 1971)  
Chemical Abstracts 76, No. 4, 17798h (Jan. 24, 1972)

Balassa, Leslie L.  
British Patent 1,252,373 (Nov. 3, 1971)  
Chemical Abstracts 76, No. 4, 17797g (Jan. 24, 1972)

Der Marderosian, Ara H. (Philadelphia Coll. Pharm. Sci., Philadelphia, Pa.)  
Chemical Abstracts 76, No. 4, 17743k (Jan. 24, 1972)

Mincer, Tadusz, and Zbigniew Blaszczyk (Akad. Med., Gdansk, Poland)  
Chemical Abstracts 75, No. 11, 73397c (September 13, 1971)

Tasman Vaccine Laboratories Ltd. (New Zealand) (pat.)  
British Patent 1,227,906  
BFMIRA Abstracts 24, No. 6, Abstract No. 1873, 386 (June 1971)

The process aims to cut down pollution caused by effluent from abattoirs, meat works, etc., and to provide a means of reclaiming the proteins and other metabolic products contained in such effluent. According to the present method the effluent passes through a bed of particulate ion exchange material, usually regenerated cellulose, to remove the major portion of proteins and fats. The ion exchange material is then regenerated, and the two steps of the process are alternated.  
Reprinted

Shvydkaya, N. A., and E. A. Nasedkina (U.S.S.R.)  
Chemical Abstracts 75, No. 11, 75092p (September 13, 1971)

Fehmerling, Gottlieb Bernhard; assignor to Ocean Research Corp., Bridgeton, NJ 08302 (pat.)

U.S. Patent 3,622,379 (November 23, 1971)

This invention deals with the production of a clean shell of a marine creature (clams, oysters, scallops, ...) that can be used as a food container or decorative article.

Dabike, Gonzalez Monica  
Chemical Abstracts 73, No. 1, 3058t (July 6, 1970)

6.18 SOLUBILIZATION OF IRON IN A CALCAREOUS SOIL  
(6.36) BY PRODUCTS OF BACTERIAL (MICROBIAL) DEGRADATION OF SEAWEED  
AND FISH FLOUR (MEAL)

Egorova, L. N., and L. R. Kopylenko (U.S.S.R.)  
Chemical Abstracts 74, No. 9, 41247g (March 1, 1971)

6.197 PHOSPHORUS AND CALCIUM IN FISH MEAL FEED

**FUCOSE-CONTAINING POLYSACCHARIDES IN ASCOPHYLLUM NODOSUM**

Larsen, Bjoern, and Arne Haug (Norw. Inst. Seaweed Res., Norges Tek. Noegsk, Trondheim, Norway)

Chemical Abstracts 74, No. 7, 28854h (Feb. 15, 1971)

6.32 DEGREE OF POLYMERIZATION AND POLYDISPERSITY OF MANNAN AND XYLAN IN SIPHONEOUS GREEN ALGAE

Mackie, William, and D. B. Sellen (Astbury Dep. Biophys., Univ. Leeds, Leeds, England)

Chemical Abstracts 74, No. 7, 28855j (Feb. 15, 1971)

### 6.32 SEASONAL VARIATIONS IN GROWTH, ALGINIC ACID, AND MANNITOL CONTENTS OF SARGASSUM WIGHTII AND TURBINARIA CONOIDS FROM THE GULF OF MANNAR INDIA

Rao, M. Umamaheswara (Cent. Mar. Fish. Res. Inst., Mandapam Camp, India)

Chemical Abstracts 74, No. 7, 28857m (Feb. 15, 1971)

The process involves autolysis of the *Chlorella* with protease of *Bacillus* and the addition of sugar and treatment with lactic acid bacteria. FFTP

Food Technology 25, No. 11, 116 (November 1971)

Urano, T. (pat.)

**CHLORELLA BEVERAGE**

6.54 FISH PASTE PRODUCT

$$(3.11)$$

Zenkoku Kamaboko Suisan Kakokoyo Kyodo Kumiai Rengokai (pat.)  
Japanese Patent 18588/71

Food Technology 25, No. 11, 118 (November 1971)

The fish meat is minced in an aqueous bleaching composition containing a **FTP** nonionic surfactant.

6.54 FISH PROTEIN CONCENTRATES

Spinnell, J.; U.S. Department of the Interior (pat.)  
U.S. Patent 3,598,606

**Food Technology** 25, No. 12, 77 (1289) (December 1971)

The fish material is treated with an acidic solution of a condensed inorganic phosphate (such as hexametaphosphate) to insolubilize the protein fractions. FTP

[4 figures, 4 tables, 5 references] [Authors' abstract modified by FTP

The fish protein concentrates had similar amino-acid compositions, and the proteins seemed to be made of peptide chains very much alike in molecular weight.

6.54 AMINO ACID SPECTRA OF FISH PROTEIN CONCENTRATES  
(7.84) (6.139) AS A FUNCTION OF PROCESSING

Rahman, Muhammad A. (Texas A&M Univ., College Station, Tex.)  
Chemical Abstracts 75, No. 9, 62298k (August 30, 1971)

6.54  
(1.22)

Wartenberg, Lech, and Barbara Trebusiewicz (Wydz. Wyzsza Szk. Roln., Wroclaw, Poland)  
Chemical Abstracts 74, No. 17, 84745k (April 26, 1971)

1/ Contains 62% protein.  
1 illustration, 2 tables] FTP

Desired protein content of juice	Ingredient			Total amount of juice obtained
	Juice powder	Solubilized soya protein <sup>1</sup> /	Water	
percent	grams	grams	grams	grams
0	1.0	--	7.30	8.30
5	1.0	0.73	7.30	9.03
10	1.0	1.59	7.30	9.89



<p>7.01 FURTHER STUDIES ON THE EFFECT OF AMINO ACID SUPPLEMENTATION ON THE URINARY NITROGEN COMPOUNDS IN RATS FED A LOW-CASEIN DIET</p> <p>Kiriyama, Shuhachi, Tomoko Suzuki, and Hiroyuki Iwao (National Institute of Nutrition, 1 Toyamacho, Shinjuku-ku, Tokyo, Japan)</p> <p>Agricultural and Biological Chemistry <u>35</u>, No. 12, 1844-1851 (Dec. 1971)</p> <p>In earlier work on the evaluation of the quality of dietary protein, the senior author and coworkers found that the ratio of urinary allantoin (A) to urea (U) multiplied by protein intake (<math>I_p</math>) [<math>A/U \cdot I</math>] changes in proportion to the dietary amino-acid balance, and further they found that this method of evaluating protein quality was more sensitive than that based on the growth rate or nitrogen balance. The purpose of the present study was to obtain information on the change in urinary nitrogen compounds in rats fed an "imbalanced" or a "corrected" diet, particularly in relation to the effect of the nature of the dietary source of carbohydrate. In the earlier experiments pregelatinized starch was used as the dietary source of carbohydrate; in the present experiments sucrose or an equimolar mixture of glucose and fructose was used as the dietary source of carbohydrate. The rats were fed an 8% casein basal diet supplemented with 0.3% DL-methionine or 0.3% DL-methionine plus 0.36% DL-threonine or 0.18% L-threonine. Observations were made of the changes in urinary excretion of urea and allantoin and for body weight gain and percent nitrogen retention. The researchers indicated that differences in nitrogen utilization by the rats (as expressed by growth rate or percent nitrogen balance) became significant by the addition of 0.3% methionine to the basal diet, and it was further increased by the simultaneous supplementation with 0.36% DL-threonine or 0.18% L-threonine. The authors suggest</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 5 PAGE 17</p>	<p>7.0 ACTIVATION ANALYSIS OF TRACE ELEMENTS IN LIPIDS WITH EMPHASIS ON MARINE OILS</p> <p>Lunde, Gulbrand (Central Institute for Industrial Research, Forskningsvn. 1, Oslo 3, Norway)</p> <p>Journal of the American Oil Chemists' Society <u>48</u>, No. 10, 517-522 (October 1971)</p> <p>The author gives a brief introduction to activation analysis and describes some of the main features of the method as applied to biological materials. The distribution of trace elements in oils was examined by use of autoradiography and <math>\gamma</math>-spectroscopy. Oils relatively high in phospholipids have a more homogeneous distribution of trace elements than do oils low in phospholipids. In concluding the article, the author suggests that when studying the effect of trace elements on the autooxidation of oils, more emphasis should be given to the distribution of these trace elements and on how this distribution is influenced by the content of phospholipids and probably also of the content of small amounts of water in the oils. [6 figures, 3 tables, 6 references]</p> <p>FTP</p> <p>7.0 SAMPLING AND SAMPLING TECHNIQUES IN MARINE CHEMISTRY</p> <p>Grasshoff, Klaus (Inst. Mar. Res., Kiel Univ., Kiel, Germany)</p> <p>Chemical Abstracts <u>76</u>, No. 8, 37207c (Feb. 21, 1972)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 5 PAGE 17</p>
<p>7.8 TRACE ELEMENTS AND COMPOUNDS IN WATERS</p> <p>(8.8)(9.19)</p> <p>Taylor, Floyd B. (Division of Water Hygiene, Environmental Protection Agency, Boston, Mass.)</p> <p>Journal of the American Water Works Association <u>63</u>, No. 1, 728-733 (November 1971)</p> <p>The author discusses the chemical constituents of drinking water from the standpoints of limits of standards and occurrence in U.S. water supplies. Three tables are given: (1) Number of water supply and distribution samples where average delivered water exceeded specific constituent levels, (2) Health and aesthetic significance of trace elements and compounds and their occurrence in U.S. water supplies, (3) Health and aesthetic significance of trace elements and compounds in finished drinking water.</p> <p>[5 illustrations, 3 tables, 5 references]</p> <p>FTP</p>	<p>7.42 DETERMINATION OF TRACE AMOUNTS OF MERCURY BY NONFLAME ATOMIC ABSORPTION TECHNIQUES</p> <p>Ramirez-Munoz, J. (Sci. Instrum. Div. Beckman Instrum., Inc., Fullerton, Calif.)</p> <p>Chemical Abstracts <u>75</u>, No. 22, 136757h (November 29, 1971)</p> <p>FTP</p> <p>7.4 SIMPLE AND VERSATILE ATOMIC FLUORESCENCE SYSTEM FOR DETERMINATION OF NANOGRAM QUANTITIES OF MERCURY</p> <p>Muscat, V. I., T. J. Vickers, and Anders Andren (Florida State University, Tallahassee, FL 32303)</p> <p>Analytical Chemistry <u>44</u>, No. 2, 218-221 (February 1972)</p> <p>This paper reports on a flameless atomic fluorescence system for mercury that makes use of either reduction-aeration or combustion techniques for the generation of mercury vapor and a silver amalgamator for collection of mercury prior to final measurement. The system can determine mercury in samples containing as little as 0.6 ng. of Hg. Data are given on the application of the system to the determination of mercury in rock, water, wheat flour, and natural sediments.</p> <p>[4 figures, 1 table, 13 references]</p> <p>FTP</p>
<p>7.80 DEVELOPMENT OF A TOTAL REDUCING SUBSTANCE TEST FOR ASCERTAINING OYSTER QUALITY</p> <p>(1.81)</p> <p>Lagarde, Stephen C. (Louisiana State Univ., Baton Rouge, La.)</p> <p>Chemical Abstracts <u>75</u>, No. 13, 87158c (Sept. 27, 1971)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 5 PAGE 17</p>	<p>7.42 DETERMINATION OF TRACE AMOUNTS OF MERCURY BY NONFLAME ATOMIC ABSORPTION TECHNIQUES</p> <p>Ramirez-Munoz, J. (Sci. Instrum. Div. Beckman Instrum., Inc., Fullerton, Calif.)</p> <p>Chemical Abstracts <u>75</u>, No. 22, 136757h (November 29, 1971)</p> <p>FTP</p>

Vyncke, W. (Rijksstation voor Zeevisserij, Stadhuis, Oostende, Belgium)  
Mededelingen Fakulteit Landbouw-Wetenschappen Gent **35**, No. 4, 1033-1046 (1970)

During spoilage of fish, ammonia is one of the many volatile nitrogen bases that are formed. Ammonia can be formed through various reactions such as (1) conversion of urea to carbon dioxide and ammonia by means of bacterial urease; (2) degradation of nucleic bases to ammonia through a series of reactions involving ATP-ase, Myokinase, and AMP-deaminase; (3) oxidation of amines by bacterial aminooxidases leading to the formation of ammonia; and (4) oxidative desamination of amino acids. Also, free ammonium occurs in the tissue of living fish as a result of normal desamination during cell metabolism. In this study, the author examined the possibility of the use of the level of ammonia in the tissue as an objective test of quality of fish and crustaceans. The experiments were carried out on four representatives of bony fishes (cod, plaice, redfish, herring), on two cartilaginous fish (cowhsh and dogfish) and on two crustaceans (shrimp, lobster).

The shrimp were cooked on board ship and the lobsters were cooked a few hours after they were landed ashore. The fish were divided into two lots; the first lot was iced and stored at 0° C. and the second lot was held for 15 hr. at 15° C., then it was iced and stored at 0° C. Separate lots of shrimp and of lobsters were stored at 0° C. and 20° C. At periodic intervals determinations were made of ammonia, total volatile basic nitrogen, and trimethylamine.

The ammonia content of the tissue was of limited value as an objective test for quality of bony fish. The level of ammonia in the tissue of cartilaginous fish is a good objective test of the quality of such fish. The crustaceans became of borderline acceptability when the concentration of ammonia in the tissues reached 45 to 50 mg. N %. [7 figures, 15 references] FIP

that, in as much as the level of urea and allantoin excretion was highly susceptible to slight changes in dietary amino-acid balance, use of the  $A/U \cdot I_p$  value provides a sensitive and reliable assessment of dietary protein quality.

Sundsvold, O.C., B. Upstad, G. W. Ferguson, D. Feeley, and I. McLachlan (Univ. of Oslo, Norway). *Chemical Abstracts* 75, No. 15, 97324t (October 11, 1971)

7.597  
(7.874)

7.51 COMBINED CHROMATOGRAPHIC AND ELECTROPHORETIC STUDIES OF SACROPLASTIC PROTEINS AND THEIR ENZYMIC ACTIVITIES IN CYCLOSTOMES AND FISH

Filosofova, E. M., and T. P. Serebrennikova (Inst. Evol. Physiol. Biochem., Lenin  
grad, U.S.S.R.)  
Chemical Abstracts 74, No. 5, 20762F (Feb. 1, 1971)

7.0 COLOR MEASUREMENT OF FOODS: XXXI. MISCELLANEOUS: PART 1

Clydesdale, F. M., and F. J. Francis (Department of Food Science and Technology, University of Massachusetts, Amherst, MA 01002)

Food Product Development 6, No. 1, 66, 68, 70, 72, 77, 79 (February-March 1972)

The authors discuss color measurement of edible oils and fats, wide range spectrophotometry, and automatic detection of blood in eggs. [5 figures, 45 references]

Described in this article is a simple modification of column design that greatly increases the maximum flow rates obtainable on porous Sephadex gels without significantly impairing the resolution. This modification consists of an internal support of siliconized glass beads (6 mm. in diameter). With this modification, the gel can withstand greater operating pressures without being compressed. Thus, this "bead column" operates in a manner similar to a series of short columns linked end to end. The method may, therefore, be used when rapid separations on Sephadex are required.

chussets General Hospital, Boston, MA 02114)  
and Elizabeth Painter (Transplantation Center,  
Science 175, No. 4023, 781-782 (February 18, 1972))

# IMPROVED FLOW RATES WITH POROUS SEPHADEX GELS

7.463 SIMPLE, RAPID POTENTIOMETRIC METHOD FOR THE ESTIMATION OF FLUORIDE IN VEGETATION

Jacobson, Jay S., and Laurence I. Heller (Boyce Thompson Inst. Plant Res., Yonkers, N.Y.)  
Chemical Abstracts 74, No. 21, 107993f (May 24, 1971)

of N-nitrosamines are given.  
[2 tables, 21 references]

The photolytic decomposition of N-nitrosamines follows first order kinetics under most conditions. Reaction half lifetimes for the photolytic decomposition of N-nitrosamines are given.

N-nitrosamines may be produced by chemical and bacterial action on secondary amines in the presence of nitrates; hence they may present a hazard with foods containing amines and nitrates. A recent method for estimating the concentration of nitrosamines involves the differential polarography of sample solutions before and after photolysis--the nitrosamine concentration in the presence of light-stable contaminants is estimated by difference [C. L. Walters, E. M. Johnson, and N. Ray, *Analyst* 95, 485 (1970)]. The purpose of the present study was to determine the conditions that affect the rates of photolysis of nitrosamines in order to specify more precisely analytical procedures, prior to the final polarographic of spectro-photometric measurement. The effects of pH and of buffer composition were ex-

Burns, D. Thorburn, and Geraldine V. Alliston (Department of Chemistry, University of Technology, Loughborough, Leics., England)  
Journal of Food Technology 6, No. 4, 433-438 (December 1971)



7.9 THE DETERMINATION OF NITRILTRIACETIC ACID (NTA) IN SEWAGE AND SEWAGE EFFLUENT

Longman, C. F. (Unilever Research Laboratory, Port Sunlight, Cheshire, England), M. J. Stiff, and Deirdre K. Gardiner (Water Pollution Research Laboratory, Department of the Environment, Stevenage, England) Water Research 5, No. 12, 1171-1175 (Dec. 1971)

Sodium nitrilotriacetate has been proposed as a replacement for phosphate in detergents. In this paper the authors describe their examination of the accuracy of the published methods for determining NTA and the modifications necessary to develop a satisfactory method to determine trace quantities.

The authors indicate that published methods for the determination of NTA are subject to interference in the analysis of sewage and sewage effluents. As a modification of the zinc-zincon method of determination, they propose passage of the sample through a chelating resin column as a pretreatment to eliminate metal interference. [1 table, 5 references]

Chemical Abstracts 73, No. 23, 119274q (Dec. 7, 1970)

Gheorghe, Vasile, Marioara Manea, Florin Jantea, and Doina Bad-Oprisescu (Inst. Ig. Sanatate Publ., Bucharest, Romania)

7.879  
3.2499 DETERMINING THE PRESERVING STATE OF FROZEN ATLANTIC COD AND HORSE MACKEREL. II. DYNAMICS OF THE PHYSICO-CHEMICAL AND BACTERIOLOGICAL INDICATORS IN THE SPOILING PROCESS

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 5 PAGE 19

6.7 FACTORS AFFECTING THE METABOLIZABLE ENERGY VALUES OF FEEDSTUFFS FOR POULTRY

Childs, G. Richard (Central Soya Co., Ft. Wayne, Ind.) Feedstuffs 44, No. 7, 39, 49 (February 14, 1972)

This survey of the literature reveals substantial differences in reported values for metabolizable energy in any ingredient for feedstuffs for poultry. These differences may be attributed to variations in ingredient samples, age of animals, dietary nutrient levels, type of fat, and many other factors (such as, level of feed intake, level of ingredient substitution, method of processing the ingredient, environmental temperature, strain of bird, physical condition of the ingredient). Even so, the author concludes that metabolizable energy values are useful in the formulation and evaluation of poultry rations. [17 references]

DLF

7.9 RADIOIMMUNOASSAY OF INSULIN IN FISHES. EXPERIMENTS IN VIVO AND IN VITRO

Patent, Gregory J., and Piero P. Foa (Dep. Res., Sinai Hosp., Detroit, Mich.) Chemical Abstracts 74, No. 21, 108655j (May 24, 1971)

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 5 PAGE 61

7.89 SYMPOSIUM: TEXTURE MEASUREMENT

Authors as listed below Food Technology 26, No. 1, 34 ff. (January 1972)  
The first three articles of the Symposium appear in this issue of the journal; subsequent issues will contain additional articles.

"Texture--Its Definition, Measurement & Relation to Other Attributes of Food Quality," by Amihud Kramer (Dept. of Food Science, University of Maryland, College Park, MD 20742), pp. 34-36, 38-39.

The author discusses the problems involved in defining texture as a major component of sensory food quality and gives the present generally accepted definition--that one of the three primary sensory properties of foods which relates entirely to the sense of touch or feel and is, therefore, at least potentially capable of precise measurement objectively by mechanical means in units of mass, or force." The author then discusses the measurement of texture and the relation of texture to other properties of food. [1 figure, 17 references]

"Sensory Assessment of Food Texture," by Judith A. Abbott (Horticultural Research Branch, Market Quality Research Division, ARS, U.S. Department of Agriculture, Beltsville, MD 20705), pp. 40, 42, 45-49.

Sensory panels are necessary for assessing the relative importance of texture to the acceptability of the food item and for determining the validity of instrumental (objective) measurements of texture related properties. The author refers to published reports on general sensory testing methodology and discusses preference/discrimination, and descriptive sensory test methods as they relate to evaluation of food texture. [3 figures, 3 tables, 25 references] (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 5 PAGE 19

6.8 SOME FLOW PROPERTIES OF FOODS IN NULL GRAVITY

Rambaut, Paul C. (Preventive Medicine Division, Medical Research and Operations Directorate, NASA/Manned Spacecraft Center, Houston, TX 77058), Charles T. Bourland (Life Sciences Division, Technology Incorporated, 17311 El Camino Real, Houston, TX 77058), Norman D. Heidelbaugh, Clayton S. Huber, and Malcolm C. Smith, Jr. Food Technology 26, No. 1, 58-63 (January 1972)

This paper reports on a systematic testing program to evaluate the flow properties of 72 thermostabilized, frozen, or rehydratable foods and beverages proposed for use in the Skylab Orbital Workshop. The foods and beverages were tested under null gravity conditions produced by aircraft and under actual space flight conditions. The rheological behavior of foods differ in space. The authors conclude, however, that proper selection and adaptation of food formulations and packaging will allow most foods to be easily handled in space flight. Because of the various constraints on foods for space flights, freeze-dried foods appear to be favored for use in future space food systems. [11 figures, 1 table, 13 references]

DLF

7.86 PROCEDURE FOR THE ISOLATION OF PSYCHROPHILIC MARINE BACTERIA

Tajima, Kenichi, Yoshio Ezura, and Minoru Sakai (Laboratory of Microbiology, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)

Bulletin of the Faculty of Fisheries Hokkaido University 22, No. 1, 73-79 (May 1971) (In Japanese) [4 figures, 1 table, 12 references]

COMMERCIAL FISHERIES ABSTRACTS VOL 52 NO 5 PAGE 61



# MAJOR PROBLEM IN METABOLIZABLE ENERGY DETERMINATIONS OF FEEDSTUFFS FOR POULTRY

(191)  
(6)  
6

Halloran, Hobart R. (Halloran Research Farm, Inc., Modesto, Calif.)  
Feedstuffs 77, No. 7, 38-39 (February 14, 1972)

Variations in results for the analyses of chromium in metabolizable energy determinations can give erroneous values for metabolizable energy for feed ingredients. Chromium oxide is added to feed as an inert indicator material. The feed and the feces are analyzed for chromium and from these data the feces-to-feed ratio can be calculated without having to quantitatively measure feed intake and feces production. The present article reports on the results of a collaborative test among five different laboratories on the analysis of chromium in feeds and feces. Also, the author shows the variations in results for metabolizable energy as they are affected by the variations in results for the analyses of chromium. The paper demonstrated that variations in results for the assay for chromium in feeds can be one of the major problems in metabolizable energy determinations of feedstuffs. Furthermore, an inquiry of investigators in the field of poultry research revealed that five of them used the total collection method to determine the feces-to-feed ratio because of the problem involved in the assay for chromium.

11P

[3 tables, 96 references]

## AUTOMATED METHOD FOR DETERMINATION OF MERCURY

8.42

Bailey, B. W., and F. C. Lo (Div. Lab. Res., New York State Dep. Health, Albany, N.Y.)

Chemical Abstracts 75, No. 24, 147489y (December 13, 1971)

The Center, General Foods Corp., White Plains, N.Y. 10601 (52901) presents a new method for the determination of mercury in foodstuffs. The method involves the use of a cold vaporization technique. The apparatus consists of a reaction vessel, a gas-liquid separator, and a detector. The reaction vessel is filled with a solution of potassium permanganate and sulfuric acid. The gas-liquid separator is filled with a solution of sodium hydroxide. The detector is a cold vapor fluorescence detector. The method is simple, rapid, and accurate. It can be used for the determination of mercury in a wide variety of foodstuffs.

11P

[3 figures, 3 tables, 52 references]

Rheology is the branch of physics that deals with the deformation and flow of materials (solids and fluids). The rheological behavior of foods is associated with their textural characteristics. This paper discusses the elementary concepts of rheology relative to the textural properties of foods.

11P

## ELEMENTARY CONCEPTS OF RHEOLOGY RELEVANT TO FOOD TEXTURE STUDIES

7.89

Finney, Essex E., Jr. (Instrumentation Research Laboratory, Market Quality Research Division, ARS, U.S. Department of Agriculture, Beltsville, MD 20705)  
Food Technology 26, No. 2, 68-77 (Feb. 1972)

8.50  
(0.35)

[NONPROTEIN NITROGEN COMPOUNDS IN THE MUSCLE TISSUE OF THE LARGE CHELAE AND THE ABDOMEN OF ASTACUS LEPTODACTYLUS ESCH RESTSTICKSTOFF-SUBSTANZEN IN DER SCHEREN-UND SCHWANZMUSKULATUR VON ASTACUS LEPTODACTYLUS ESCH

Partmann, Walter (Bundesforschungsanstalt für Lebensmittel-frischhaltung, Karlsruhe, Germany)  
Archiv für Fischereiwissenschaft 22, No. 2, 103-109 (October 1971) (In German)

The free ninhydrin-reactive substances from the abdomen and the large chelae for three groups of the fresh-water crayfish were determined separately by column chromatography. The total of the estimated components was higher for the muscle tissue from the large chelae than for the muscle tissue from the abdomen.

Ninhydrin reactive substances found in high amounts were (in decreasing level of concentration): arginine, glycine, glutamine,  $\beta$ -alanine,  $\alpha$ -alanine, taurine, anserine, methionine, glutamic acid. The levels of lysine, anserine, and arginine were lower in the muscles of the large chelae than in the muscles of the abdomen; the opposite was true for glutamine, histidine, and tyrosine.

[2 figures, 2 tables, 13 references]

11P

Guatelli, M. A., N. A. Galleo Gandara De Fernicola, and M. Neira Rodriguez (Fac. Farm. Bioquim., Univ. Buenos Aires, Buenos Aires, Argentina)  
Chemical Abstracts 75, No. 11, 75042x (September 13, 1971)

## ARSENIC CONTENT IN SEAFOODS IN BUENOS AIRES, ARGENTINA

8.42

(9.19)

IDENTIFICATION OF THE GAS CHROMATOGRAPHIC DIELDRIN AND ENDRIN PEAKS BY CHEMICAL CONVERSION

(61.6)  
6.7

Woodham, D. W., and C. D. Loftis, and C. W. Collier (Agricultural Research Service, Plant Protection Division, U.S. Department of Agriculture, Gulfport, MS 39501)  
Journal of Agricultural and Food Chemistry 20, No. 1, 163-165 (January-February 1972)

In the Pesticides Monitoring Program (Initiated by USDA in 1964), analyses are made regularly on soil, water, sediment, and crop samples for a variety of pesticides. These tests include analyses for dieldrin (1,1,1-trichloro-2,2,4,4-tetrahydro-5,6-epoxy-7,8-dimethanonaphthalene) and endrin (1,1,1-trichloro-2,2,4,4-tetrahydro-5,6-epoxy-7,8-dimethanonaphthalene). Even though there is no evidence of a buildup of these two pesticides in the environment, we require a reliable identification method to confirm any suspected dieldrin or endrin gas chromatographic peak because of their widespread use, their persistence in soils, and the rapid conversion of aldrin to dieldrin. Furthermore, identification methods for these and for other pesticides are becoming increasingly important with the finding of polychlorinated biphenyls in environmental samples.

In the present article, the authors describe a simple and rapid method for the simultaneous confirmation of dieldrin and endrin residues in soil, sediment, water, corn stalks, and soybeans. The one-step sample treatment technique involves the use of 10% boron trichloride in 2-chloroethanol for the conversion of dieldrin and endrin into their corresponding derivatives. The dieldrin conversion requires 2-hr. reaction time and the endrin conversion requires 10-min. reaction time; parent residues can be confirmed at the 0.01-0.1 p.p.m. level.

11P

[see references]



8.53 MACKEREL LIPIDS AND FATTY ACIDS

Ackman, R. G., and C. A. Eaton (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia, Canada)

Canadian Institute of Food Technology Journal 4, No. 4, 169-174 (1971)

The proportions of major lipids and of their fatty acids in the light muscle and the dark muscle of mackerel (*Scomber scombrus*) were determined. The two muscles differed sharply in lipid content; the dark muscle had about 12% lipid in the spring males and 7% in the spring females, and the light muscle had 2% to 3% in both sexes. Fall mackerel showed about twice as much lipid in the dark muscle and three times as much lipid in the light muscle as did the spring mackerel. Data on the fatty acid compositions of the total lipids of different muscle samples from three lots of fish and of triglycerides and phospholipids from muscles of another lot of fish are compared.

[1 figure, 7 tables, 42 references]

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9.11 OCEANOGRAPHIC SURVEY DEVICE

Starkey, Bertrand Julian, and Alexander Smith Watson (Bartmouth, Nova Scotia, Canada); assigns to EMI Limited, Hayes, Middlesex, England (pat.) U.S. Patent 3,628,205

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12 PAGE 5 ON 52 TOA SIDVABSTRA



1.6 (1.58) (2.21)  
[FURTHER RESULTS OF LONGTERM OBSERVATIONS ON THE OCCURRENCE OF BY-CATCH FISH AND CRUSTACEANS IN THE CATCHES OF THE GERMAN SHRIMPS FISHERY (1961-1967)]  
WEITERE ERGEBNISSE VON LANGZEITBEOBACHTUNGEN ÜBER DAS AUFTRETEN VON BEIFANGFISCHEN UND -KREBSSEN IN DEN FÄNGEN DER DEUTSCHEN GARNELENFISCHEREI (1961-1967)  
(summary in English)

Tiews, K. (Institut für Küsten- und Binnenfischerei der Bundesforschungsanstalt für Fischerei, Hamburg, Germany) (In German; Archiv für Fischereiwissenschaft 22, No. 3, 212-255 (December 1971))

This paper contains additional data covering the period 1961-1967 on the composition of the catches of the German shrimp fishery--the original study started in 1961 in  
[2 figures, 7 tables, 11 references]  
FTP

Animal Behaviour 19, No. 2, 217-225 (May 1971)

Thunberg, Bruce Einar (School of Oceanography, University of Rhode Island, Kingston, RI 02881)

9.12 OLFACTION IN PARENT STREAM SELECTION BY THE ALEWIFE (ALOSA PSEUDOHARENGUS)

ECOSYSTEM ALTERATION BY MOSQUITO FISH (GAMBusia affinis holbrooki) IN PREDATION  
Hurlbert, Stuart H., Joy Zedler, and Deborah Fairbanks (Department of Biology, San Diego State College, San Diego, CA 92115) (February 11, 1972)  
Science 175, 639-642 (February 11, 1972)

Controlled experiments were conducted on the role of the mosquitofish in artificial aquatic systems. The purpose was to show how extensive the effects of a fish population can be and how fish populations can influence eutrophication. The authors found that in artificial pools the mosquitofish greatly reduced rotifer, crustacean, and insect populations and thus permitted extraordinary development of phytoplankton populations. Other effects produced were decreased optical transmissivity and increased temperature of the water, decreased levels of dissolved inorganic phosphorus and increased levels of dissolved organic phosphorus, inhibition of Spirogyra, and replacement of one anoanun lipid, Chaetogaster, by another, Aeolosoma.

The authors suggest that excessive phytoplankton principal symptom of eutrophication (may in some cases be more directly a result of man-caused alterations in fish populations than of man-caused increases in nutrient influx. Further manipulation of fish populations, especially the enhancement of piscivore populations, is a potential method for reducing phytoplankton biomass. However, such a method may increase the risk of disease in the fish. It is important to note that the authors believe that the removal of fish from a system may have a higher place in the conceptual scheme of man-caused eutrophication than the removal of fish from a system.

9.12 SOME EFFECTS OF SALINITY AND TEMPERATURE ON EARLY DEVELOPMENT OF PACIFIC HERRING (CLUPEA PALLASI)

Alderice, D. F., and F. P. J. Velsen (Biological Station, Fisheries Research Board of Canada, Nanaimo, British Columbia, Canada) (Journal of the Fisheries Research Board of Canada 28, No. 10, 1545-1562 (October 1971))

On the basis of comparison of laboratory and field observations, the authors suggest that occurrence and abundance of herring are related to the availability and extent of spawning salinities between 8 and 28‰. Population abundance of herring in northern waters appears to be associated with spawning temperature of 5°-9° C.; abundance is limited by temperatures of 9°-10° C.; and maximum temperature for spawning is about 10° C. Furthermore, the authors indicate that survival of viable larvae to yolk sac absorption would place the lower limit of thermal tolerance of Pacific herring eggs at between 4° and 5° C.

[8 figures, 6 tables, 5 references]

FTP

[2 figures, 2 references]

In testing the effects of water-borne pollutants on the nervous system of rainbow trout, the authors had to develop a technique to record electrical activity from the trunk lateral-line nerve for extended periods of time (up to 48 hr.). This paper describes the technique that they developed.

Progressive Fish-Culturist 34, No. 1, 59-61 (January 1972)

Bahr, Thomas G. (Institute of Water Research, Michigan State University, East Lansing, MI 48823)

9.13 RECORDING ELECTRICAL ACTIVITY FROM THE LATERAL-LINE NERVE (9.19) IN TROUT

THE ELECTRIC SENSE OF SHARKS AND RAYS

Kalmijn, A. J. J. (Scripps Institution of Oceanography, La Jolla, CA 92037) (Journal of Experimental Biology 55, No. 2, 371-383 (October 1971))

Earlier work by various researchers have shown that (a) the shark and the ray are sensitive to weak electric fields, (b) the electric sensitivity of these fish is due to the ampullae of Lorenzini, (c) these fish can be stimulated by the bioelectric fields emanating from the flatfish Pleuronectes platessa. In the present study, the author carried out a series of experiments to determine whether the shark Scyliorhinus canicula and the ray Raja clavata utilize the bioelectric fields of the flatfish to detect the position of their prey. The experiments described in this paper demonstrated that this shark and this ray did make biologically significant use of their electric sensitivity to detect the position of their prey (a live flatfish). The author states, therefore, that we are justified in accrediting the animals with an electric sense and in designating the ampullae of Lorenzini as electroreceptors.

[2 figures, 11 references]

9.14 INTERACTIONS IN THE METABOLISM OF POLYUNSATURATED FATTY ACIDS (9.13) (1.33) IN THE COHO SALMON ONCORHYNCHUS KISUTCH  
Tinsley, Ian J., James B. Saddler, Hugo M. Krueger, and Robert R. Lowry (Dep. Agric. Chem. Fish. Wildl., Oregon State Univ., Corvallis, Oreg.) (Chemical Abstracts 75, No. 11, 73357e (September 13, 1971))



## CAROTENOIDS AND VITAMIN A IN SALMO IRIDEUS EGGS AND THEIR SIGNIFICANCE IN THE INITIAL PERIODS OF THE EMBRYOGENESIS

Georgiev, George S. (Higher Institute of Veterinary Medicine, Sofia, Bulgaria)  
Folia Balcanica 2, No. 9, 1-11 (1971) (Fisheries Institute of S.R. of Macedonia,  
Pošt. fah 180, Skopje, Yugoslavia)

Earlier, researchers have shown that the high mortality rate during the incubation of eggs of rainbow trout is due to the absence of some essential substances which the mother fish failed to provide the eggs. S. Hirao and J. Yamada [Bull. Japan. Soc. Fish. 21, 240-243 (1955)] found that rainbow trout eggs lacking in iron and vitamin B<sub>12</sub> show lowered percentage of hatching. In the present study, the author determined the levels of carotenoids and vitamin A in trout eggs and tried to correlate these values with the maturity of the eggs and the discharge of the eggs by the female. They found that (1) the carotenoid and vitamin A content of the eggs is greater in the eggs last to mature, (2) the main pigment in the eggs of naturally developing trout was astaxanthin and in the eggs of artificially bred trout was lutein, (3) the vitamin A content in the eggs of artificially bred trout is higher than that of naturally bred trout, and (4) the eggs with low carotenoid content showed a high mortality rate during the period of greatest sensitivity between the 12th and 15th day of incubation.

FTP

[1 figure, 2 tables, 16 references]

## MECHANISMS FOR SYNTHESIS OF ORGANIC MERCURY FOUND IN FISH

Anonymous

Nutrition Reviews 30, No. 1, 16-18 (January 1972)

Non-enzymatic methylation of mercury has been shown to occur readily in the presence of methyl cobalamine and mercuric chloride. In *Neurospora crassa*, an organism not requiring vitamin B<sub>12</sub> or its derivatives, mercury methylation appears to be a detoxification reaction involving one or more steps of the methionine biosynthesis pathway.

The toxic methyl mercury is readily synthesized by microorganisms and under conditions that exist in the sludge at the bottom of lakes, canals, and bodies of water where fish may ingest and concentrate it in their tissues. It is still not clear from the evidence whether methyl mercury can be synthesized by fish, but it seems most likely from these studies that synthesis by microorganisms is the major source.

Reprinted in part

Chemical Abstracts 75, No. 7, 45985q (August 16, 1971)

(land)

Beynon, L. R. (BP Res. Cent., Br. Pet. Co. Ltd., Sunbury-on-Thames, Middlesex, England)

## OIL SPILL DISPERSANTS

(9.15)

9.19

## THE EFFECTS OF DIETARY LIPIDS ON GROWTH, FOOD CONVERSION, LIPID AND FATTY ACID COMPOSITION OF CHANNEL CATFISH

Stickney, Robert R., and James W. Andrews (Skidaway Institute of Oceanography, 55 West Bluff Road, Savannah, GA 31406)  
Journal of Nutrition 102, No. 2, 249-257 (February 1972)

Channel catfish (*Ictalurus punctatus*) fingerlings were reared in 1-m-diameter fiberglass tanks at 26° and fed 27 experimental diets differing in source of lipid. Duplicate groups of fish were fed each of eight primary lipid sources and each lipid was fed at a level of 10% of diets in three molecular forms: triglyceride, free fatty acid, and ethyl ester. Highest average weights occurred when the fish were supplemented with beef tallow, olive oil and menhaden oil triglycerides. Substantially lower gains were obtained from groups fed short- and medium-chain fatty acids, a fat-free diet, safflower oil (high in 18:2n6) and linseed oil (high in 18:3n3). In general, triglyceride and ethyl ester diets led to more rapid growth of channel catfish than did free fatty acid diets. Food conversions for fish fed triglyceride diets were superior to those of fish on the other two dietary lipid types. The deposition of fatty acids in whole carcasses followed very closely the fatty acid composition of the diet whereas deviation from the dietary fatty acid composition was noted in liver.

[5 tables, 16 references]

Authors' abstract

9.14  
(9.13)

## ESSENTIAL FATTY ACIDS IN THE DIET OF RAINBOW TROUT (SALMO GAIRDNERI): PHYSIOLOGICAL SYMPTOMS OF EFA DEFICIENCY

Castell, J. D., R. O. Sinnhuber, D. J. Lee, and J. H. Wales (Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331)  
Journal of Nutrition 102, No. 1, 87-92 (January 1972)

Certain physiological changes in rainbow trout (*Salmo gairdneri*) which may be attributed to a dietary insufficiency of the essential fatty acids of the linolenic or  $\omega 3$  series are described. A greatly increased mitochondrial swelling rate was induced in fish fed a fat-free diet. Linolenic acid was most effective in reducing the swelling phenomenon. Diets without  $\omega 3$  fatty acids showed an increased liver respiration rate, a slightly lower hemoglobin content and increased muscle water.

Authors' abstract

(Abstract modified by FTP)

[2 figures, 12 references]

The successful culture of marine fishes in the laboratory will provide test animals for studies in many scientific fields and will eventually serve to prove the feasibility of culturing these fish as a source of food. This article reports on work carried out at the Tiburon Marine Laboratory on the rearing of Pacific herring in the laboratory.

Talbot, G. B., and Sven I. Johnson (Tiburon Marine Laboratory, U.S. Bureau of Sports Fisheries and Wildlife, Tiburon, CA 94920)  
Progressive Fish-Culturist 34, No. 1, 2-7 (January 1972)

## REARING PACIFIC HERRING IN THE LABORATORY









<p>9.17</p> <p>TRAVELING SCREEN FOR REMOVAL OF DEBRIS FROM RIVERS</p> <p>Bates, Daniel W., Ernest W. Murphey, and Martin G. Beam (National Marine Fisheries Service, NOAA, Biological Laboratory, 2725 Montlake Blvd. East, Seattle, WA 98102)</p> <p>NOAA Technical Report NMFS SSRF-645, 6 pp. (October 1971) Available from the U.S. Government Printing Office, Washington, DC 20402. Price \$0.25. Stock No. 0320-0016.</p> <p>This report describes the features and operation of a traveling debris screen, installed within a 12.2-m wide test flume in the Grande Ronde River near Troy, Ore. The National Marine Fisheries Service developed the screen to improve removal of debris from canals and rivers of the Pacific Northwest and to reduce costs of removal. Trash racks are now used to remove debris, but they have been considered impractical because of maintenance difficulties during floods and because of their large size.</p> <p>The debris screen, as described, appears to be practical for canal and river flows of considerable magnitude, limited only by the seasonal passage of moss. [6 figures, 1 table, 2 references]</p> <p>FTF</p>	<p>9.19</p> <p>POWER, POLLUTION, AND PUBLIC POLICY</p> <p>Ducsik, Dennis W. (editor)</p> <p>M.I.T. Report No. 24, Massachusetts Institute of Technology, National Sea Grant Program, Sea Grant Project GH-88, Cambridge, Mass. (1971), xiii + 322 pp. Price \$12.50. Available from the M.I.T. Press, Cambridge, MA 02142.</p> <p>This book discusses issues in electric power production, shoreline recreation, and air and water pollution facing New England and the Nation. It contains six chapters. The first describes the general economic and political framework governing allocative decisions relative to air, land, and water resources. The second examines the new concept of siting electric power stations at offshore locations. The third outlines a new political framework within which valuable coastal land can be managed. The fourth examines the sulfur oxide air-pollution situation and schemes for collective action to control sulfur-oxide emissions. The fifth examines the water-pollution problem in Boston Harbor. The sixth outlines a hypothetical regional government for the New England area designed to deal with the various types of problems discussed in the preceding chapters of this book.</p> <p>FTF</p>
<p>9.16</p> <p>SECTIONAL TANKS FOR FISH FARMS</p> <p>Malne, P. H. (University of Strathclyde)</p> <p>World Fishing 21, No. 1, 20, 22 (Jan. 1972)</p> <p>The author discusses briefly the construction and costs of fiber glass and plastic tanks for fish hatchery and nursery stock.</p> <p>FTF</p>	<p>9.19</p> <p>SUBLETHAL EFFECTS OF MERCURY ON MARINE ALGAE</p> <p>Boney, A. D. (Dep. Bot., Univ. Glasgow, Scotland)</p> <p>Chemical Abstracts 75, No. 11, 72928e (September 13, 1971)</p> <p>9.16</p> <p>GROWTH RESPONSE OF BLUE-GREEN ALGAE TO ALDRIN, DIELDRIN, ENDRIN AND THEIR METABOLITES</p> <p>Batterton, J. C., G. M. Boush, and F. Matsumura (Department of Entomology, University of Wisconsin, Madison, WI 53706)</p> <p>Bulletin of Environmental Contamination and Toxicology 6, No. 6, 589-594 (November-December 1971)</p> <p>Aldrin, dieldrin, endrin, and five corresponding metabolites inhibit growth of algae. Conversion of these pesticides in nature to their metabolites does not necessarily represent degradation and detoxication steps as judged from the data obtained in this study. Therefore, the authors indicate that studies on the toxicological nature of these "terminal residues" on various ecosystems appear to be imperative to understand the magnitude of the effects of pesticides in environments. [2 tables, 17 references]</p> <p>FTF</p>
<p>9.16</p> <p>INTERACTIONS OF FEEDING RATES AND ENVIRONMENTAL TEMPERATURE ON GROWTH, FOOD CONVERSION, AND BODY COMPOSITION OF CHANNEL CATFISH</p> <p>Andrews, James W., and Robert R. Stickney (Skidaway Institute of Oceanography, Savannah, GA 31406)</p> <p>Transactions of the American Fisheries Society 101, 101, 64-66 (January 1972)</p> <p>In earlier work, various researchers reported that environmental temperature affects growth, food consumption, and food conversion of catfish reared in ponds. Information on the interaction of feeding rates and temperature and their effects on growth, food conversion, and body composition of catfish would be useful to fish culturists; from such information, they could determine the optimum frequency of feeding, the amount of feed to use, and the composition of the diet. Furthermore, such information is necessary in order to determine the economic feasibility of controlling temperatures in tank or raceway high-density culture systems. The purpose of this study, then, was to obtain information on the interactions of feeding rates and environmental temperatures in channel catfish.</p> <p>Channel catfish fingerlings were held in 20-gal. glass aquaria at 18°, 22°, 26°, 30°, and 34°C.; duplicate groups at each temperature were fed 2%, 4%, and 6% of their biomass daily. After 12 weeks, sample fish from each group were weighed and were analyzed for content of total body lipid and protein composition. The highest average percentage weight gain and the best food conversion ratios were achieved in catfish reared at 26°C. Catfish reared at 18° and 22° had a feeding rate of 4% of body mass daily for rapid growth of the fish. A nearly linear increase in lipid content of 0.9% to 1.8% from 22 to 34°C. occurred with the increase in environmental temperatures of from 18° to 34°C. The arachidonic acid and docosahexaenoic acid compositions of the total fatty acids in the fish increased with increasing temperature.</p> <p>[6 figures, 3 tables, 11 references]</p> <p>FTF</p>	<p>9.19</p> <p>STUDIES ON THE PERSISTENCE OF SOME CARBAMATE INSECTICIDES IN THE AQUATIC ENVIRONMENT -- I. HYDROLYSIS OF SEVIN, BAYCON, PYROLAN AND DIMETILAN IN WATERS</p> <p>Aly, Osman M., and M. A. El-Dib (National Research Center, Water Pollution Department, Dokki, Cairo, U.A.R.)</p> <p>Water Research 5, No. 12, 1191-1205 (December 1971)</p> <p>The persistence of carbamate pesticides in natural waters is greatly influenced by the pH value and temperature of the aquatic environment. [5 figures, 4 tables, 9 references]</p> <p>FTF</p>



[TENSIDE IN THE COASTAL WATERS OF THE NORTH SEA]  
 ÜBER ANIONENAKTIVE TENSIDE IM KÜSTENGEBIET DER NORDSEE

Bock, K. J., and H. Mann (Institut für Küsten- und Binnenfischerei der Bundesforschungsanstalt für Fischerei, Hamburg, Germany)  
 Archiv für Fischereiwissenschaft 22, No. 3, 287-292 (December 1971) (In German; summary in English)

The anionic "tensides" in the mouths of the rivers Elbe, Eider, and Ems were detected very low concentrations only in the immediate vicinity of the waste water outlets. The highest concentration found was 0.3-0.5 mg/l. The authors indicate that even relatively high concentrations of alkylbenzene sulfonates are decomposed in brackish and sea water without difficulty by over 90% after a phase of adaptation.

[2 figures, 8 references]

[Authors' abstract modified by FTP]

FTP

The author argues that environmental protection is likely to be better achieved by flexible restraints than by rigid regulations.

Technology Review 74, No. 3, 58-63 (January 1972)

9.3 NATIONAL GOALS AND ENVIRONMENTAL LAWS  
 Carpenter, Richard A. (Environmental Policy Division, Congressional Research Service, Library of Congress, Washington, D.C.)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 5 PAGE 42

SOME EFFECTS OF LOGGING AND ASSOCIATED ROAD CONSTRUCTION  
 ON NORTHERN CALIFORNIA STREAMS

Burns, James W. (California Department of Fish and Game, Sacramento, CA 95814)  
 Transactions of the American Fisheries Society 101, No. 1, 1-17 (January 1972)

During the period of from 1966 through 1969, the author studied the effects of logging and road construction on four trout and salmon streams in California. The work included measurements of sedimentation in the beds of the streams, of the quality of the water, of the abundance of food for fish, and of the capacity of the stream as a nursery for fish. Apparently, logging was compatible with the production of anadromous fish when adequate attention was given to protection of the streams and clearance of the channel. In narrow streams, excessive use of bulldozers on steep slopes and in stream channels caused excessive sedimentation. Sustained logging prolonged adverse conditions in one stream.

[6 figures, 6 tables, 38 references]

FTP

Kwiatkowski, Marian, and Joanne Zoladzłowska (Inst. Przem. Org., Warsaw, Poland)  
 Chemical Abstracts 74, No. 25, 139885p (June 21, 1971)

9.19 PROTECTION OF MAN AND HIS ENVIRONMENT AGAINST THE SIDE EFFECTS  
 (9.3) OF PESTICIDE USE  
 (1.0144)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 5 PAGE 42

FERTILIZERS AND AGRICULTURAL CHEMICALS

(0.6)

Anonymous

Sub-Council Rept. of the National Industrial Pollution Control Council, Washington, D.C., 42 pp. (October 1971) Paper copy available from the Government Printing Office, Washington, DC 20402; Order No. Y3.IN2/8:2F41; price \$0.30.  
 Government Research Announcements 71, No. 22, 126 (Nov. 25, 1971)

The report lists the principal problem areas involved in the use of agricultural chemicals and suggests means of coping with these problems. It deals with the fertilizer industry and the pesticide industry in separate sections. The Sub-Council's principal recommendations for attaining desirable levels of environmental protection and production are included. (Author) Reprinted

FTP

Concept testing is an initial probe to pretest the consumer appeal of new ideas in products or services. The author suggests a revised approach that may avoid some of the pitfalls in present procedures.

Food Product Development 6, No. 1, 45-46, 48 (February-March 1972)  
 [2 tables, 5 references]

9.2 NEEDED: A BETTER WAY TO MEASURE PRODUCT CONCEPTS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 5 PAGE 42

LONG-RANGE FORECASTS OF ACTIVITIES IN THE MARINE ENVIRONMENT

Spangler, Miller B. (National Planning Association, Center for Techno-Economic Studies, Washington, D.C.)  
 Sponsored in part by U.S. Coast Guard, Washington, D.C.  
 Report in three parts (Sept. 8, 1971)  
 Government Research Announcements 71, No. 21, 23 (Nov. 10, 1971)

Part I. Chapters 1-4; 370 pp.

Contents:

Methodological aspects of forecasting activities in the marine environment and their implications for the Coast Guard;  
 New technology and search and rescue operations;  
 Regional characteristics and forecasts of socio-economic trends.

Ibid. Part II, Chapters 5-7; 315 pp.

Contents:

Forecasts of oceanographic and other R and D in the marine environment;  
 Forecasts of recreation in the marine environment;  
 Commercial fishing and aquaculture.

Ibid. Part III, Chapters 8-11; 356 pp.

Contents:

Forecasts of offshore oil and other marine mining;  
 Long-range forecasts of marine transportation activities in U.S. coastal waters;

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 5 PAGE 27

(over)

9.19 TRACE MATERIALS IN WASTES DISPOSED TO COASTAL WATERS: FAIES, MECHANISMS AND ECOLOGICAL GUIDANCE AND CONTROL

Feldman, Milton H. (Pacific Northwest Water Lab., Corvallis, Oreg.) Working Paper 78 W71-11793, FWQA-16070-07/70, 107 pp. (July 1970) Available from the National Technical Information Service, Operations Division, Springfield, VA 22151. Order No. PB-202 346; PC\$3.00; MF\$0.95.

Government Research Announcements 71, No. 21, 48 (November 10, 1971)

Wastes currently being discharged to the coastal waters of the United States include trace organic contaminants (TC), trace elements (TE), and other trace materials (TM). Those TM dealt with included: (1) known violently noxious materials (Pb(+2), (CN)2(-2), Hg(+2)); (2) materials which are biostimulatory to some species (cobalamin, iron chelates, thiamin, biotin, Mn, Mg; and (3) materials which are bioinhibitory for at least some species in various mechanisms (DDT, Se, Mn, Mg). A different view of the problem was taken in which ways of selecting the optimum organism to utilize a particular waste were preferred to methods of removing it conventionally. A thorough literature search revealed a significant lack of literature in waste breakdown for both qualitative and quantitative evaluation. It was concluded that further studies should be performed for each known trace material to determine: The mechanism whereby it is sequestered; The metabolic threshold; The active level; The harmful level; The speciation requirements; The absolute rates in and out of the compartments of which coastal waters, sediments, chemical systems phases, and biota may be considered as composed. Evaluations such as these were performed for DDT, and they must be performed for the known set of waste constituents before rational action to prevent damage to the oceans is possible. Reprinted

9.20 EMBRYOPATHIC EFFECTS OF MERCURIC SALTS

Gale, Thomas F., and Vergil H. Fenn (Department of Anatomy, Dartmouth Medical School, Hanover, NH 03755) Life Sciences, Part II Biochemistry General and Molecular Biology 10, No. 23, 1321-1326 (December 8, 1971)

This paper reports the results of a systematic study of the effects of mercuric acetate and phenylmercuric acetate on the embryogenesis in the golden hamster. The mercurials were administered to the anesthetized pregnant hamsters early on the eighth day of gestation. The fetuses removed from the female on either the twelfth or the fourteenth day of gestation showed a delayed growth rate and varying degrees of dorsally localized subcutaneous edema. Also, both mercurials produced the following manifestation of toxicity in the maternal system: weight loss, edema, diarrhea, slight tremor, and polyuria. [12 references]

The author reviews the question of nutrients responsible for eutrophication of fresh-water lakes and discusses recent additions to the literature on nutrient limitation. [1 figure, 2 tables, 83 references]

9.19 CARBON, NITROGEN, AND PHOSPHORUS AND THE EUTROPHICATION OF FRESHWATER LAKES

Schindler, D. W. (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg 19, Manitoba, Canada) Journal of Phycology 7, No. 4, 321-329 (December 1971)

The author reviews the question of nutrients responsible for eutrophication of fresh-water lakes and discusses recent additions to the literature on nutrient limitation. [1 figure, 2 tables, 83 references]

9.2

Forecasts of air transportation activities in the marine environment; Requirements for search and rescue in marine recreation; Requirements for search and rescue in other activities in the marine environment. Reprinted

[The outlined report is available from the National Technical Information Service, Operations Division, Springfield, VA 22151. Order No. Part I, AD-729 892; Part II, AD-729 893; Part III, AD-729 894; price for each Part PC\$6.00; MF\$0.95.

The author demonstrates, in this paper, that Garrett Hardin's thesis of "mutual coercion, mutually agreed upon by the majority of the people affected," is well founded, and that it represents a feasible approach to control of pollution. [3 figures, 4 tables, 4 references]

Biological Conservation 4, No. 1, 31-38 (Oct. 1971)

Fonda, R. W. (Department of Biology, Western Washington State College, Bellingham, WA 98225 U.S.A.)

9.2 THE PUGET SOUND SULPHITE PULP MILLS AND THE TRAGEDY OF THE COMMONS (9.19)

9.6 FISHING ZONE DELIMITATION OF THE ALASKAN COAST: INTRODUCING FISHERY BASELINES

Vosper, William J.

Sea Grant Technical Bulletin No. 18, University of Miami Sea Grant Program (Ocean Law), NOAA Sea Grant No. 2-35147, Coral Gables, Fla. (1971), ix + 127 pp. Price \$3.00. Available from Information Services, Sea Grant Institutional Program, University of Miami, 10 Rickenbacker Causeway, Miami, FL 33149.

The material in the bulletin was submitted by the author as a thesis in partial fulfillment of the requirements for the degree of Master of Laws in Ocean Law. The report examines the concept of fishery baselines around the coast of Alaska. [256 footnotes; bibliography of 121 references to books, articles, leaflets, cases, statutes, and other documents]

This article deals with the factors involved in designing a lake/bay management agency including the scope of the agency's powers, its geographic distribution, the interactions between it and other agencies, and the organizational form of its governing body. [10 footnotes]

9.3 INSTITUTIONS FOR MANAGING LAKES AND BAYS (9.19)

Craime, Lytle E. (School of Natural Resources, University of Michigan, Ann Arbor, Mich.)

Natural Resources Journal 11, No. 3, 519-546 (July 1971)



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COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 5 PAGE 29

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STABLE LIQUID SHORTENING AND METHOD OF PRODUCING SAME 4.81

Reid, Edward J. (Brea, CA 92621); assignor to Hunt-Wesson Foods, Inc., Fullerton, Calif. (pat.)  
U.S. Patent 3,623,888  
Official Gazette of the U.S. Patent Office 892, No. 5, 1781 (Nov. 30, 1971)

ODORLESS AND NONCAKING UREA COMPOSITIONS 4.82

Patterson, Paul R., Darryl D. Fry, and Irving Klothen (American Cyanamid Co.)  
German Offen. (Patent) 2,054,735 (May 13, 1971)  
Chemical Abstracts 75, No. 7, 1971 (Aug. 16, 1971)

9.16 TREATMENT OF WATER IN FISH HATCHERY REARING PONDS  
Williams, Earl Pierce (Pen Artyl, PA 18072), and Nathan David Field (Allentown, Pa. assignors to GAF Corp., New York, N.Y. (pat.)  
U.S. Patent 3,625,182  
Official Gazette of the U.S. Patent Office 893, No. 1, 98 (Dec. 7, 1971)  
Water of a fish rearing pond is passed through porous granular or porous bead form of a water-insoluble, cross-linked vinylpyrrolidone polymer. FTP

DEHYDRATION PROCESS 6.63

Tooby, J. J. (pat.)  
British Patent 1,238,077  
Food Technology 25, No. 12, 76 (Dec. 1971)  
A zeolite desiccating agent is used to remove moisture from the air used in drying the product--the drying air is alternately passed over the food and the zeolite material. FTP

PRESERVATION PROCESS 6.63

Nakamura, S. (pat.)  
Japanese Patent 17931/71  
Food Technology 25, No. 12, 77 (Dec. 1971)  
Foodstuffs are frozen in ethanol at less than 30° C. [sic] then they are dried with dry air at a freezing temperature. FTP

3.63 DRIED FISH PRODUCT  
Satake, M. (pat.)  
Japanese Patent 25696/71  
Food Technology 25, No. 12, 78 (1290) (Dec. 1971)  
Fish are dried by infrared irradiation at 60° C. The dried pieces are coated with a flour-sugar-monosodium glutamate mixture and again exposed to infrared irradiation treatment. FTP

MARINE ANTIFOULANT WITH COPPER, COBALT OR MANGANESE TEREPHTHALATE 2.11

Leipold, Hans A. (Chicago, Ill.) assignor to Standard Oil Co., Chicago, Ill. (pat.)  
U.S. Patent 3,623,896  
Official Gazette of the U.S. Patent Office 892, No. 5, 1782 (Nov. 30, 1971)

The marine antifoulant compositions include cobalt, copper, and manganese salts of terephthalic acid. FTP

Shrimp are immersed in an aqueous solution containing hypochlorite ions or caustic soda. FTP

Official Gazette of the U.S. Patent Office 892, No. 4, 1419 (Nov. 23, 1971)

U.S. Patent 3,622,347

2.3 TREATMENT OF SHRIMP TO REMOVE NONEDIBLE PARTS

This patent covers a system for removing fish from the hold of a fishing vessel. FTP

2.3 FISH UNLOADING SYSTEM  
Puretic, Mario J. (Terra Verde, FL 33715) (pat.)  
U.S. Patent 3,625,383 (Dec. 7, 1971)

CONTINUOUS HIGH TEMPERATURE PROCESS FOR RECLAIMING REUSABLE FRYING FATS 6.2

Lowrey, Erlend R. (Greenhills, OH 45218), and Robert O. Schmitt (Wilmington, OH 45225) (pat.)  
assignors to Procter & Gamble Co., Cincinnati, Ohio (pat.)  
U.S. Patent 3,619,006  
Official Gazette of the U.S. Patent Office 892, No. 1, 121-021 (Nov. 2, 1971)

Reusable frying fat is reclaimed by introducing it into a cylindrical container in which the fat is subjected to vortical forces. FTP

DEEP FRYING PROCESS 6.2

Bolton, P. J. (pat.)  
Canadian Patent 742,788  
Food Technology 25, No. 12, 76 (Dec. 1971)

The apparatus is used for molding articles from ground meat or ground fish. FTP

2.3 PATTY MOLDING APPARATUS

Holly, J.; Hollymatic Corp. (pat.)  
Canadian Patent 873,812  
Food Technology 25, No. 12, 76 (1288) (Dec. 1971)



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Brown, Norman L.	4	0.8	Fischer, L. G. (pat.)	29	2.3	Johnson, Sven I.	23	9.16			
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			Fonda, R. W.	28	9.2				Manes, Mariora	19	7.879

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Lejura, V. I.	26	9.17	Rogozhin, S. V. (pat.)	29	2.06	Terada, Kazuko	24	9.14			
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Lejura, M. Rajendranathan	24	9.14	Routledge, Alan W.	13	6.133	Thunberg, Bruce Einar	22	9.12			
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Lejura, M. Rajendranathan	30	3.63	--	22	9.14	Tinsley, Ian J.	22	9.14			
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Lejura, M. Rajendranathan	11	4.5	Said, S. Z.	13	6.31	Tooby, G. J. (pat.)	30	3.63			
Lejura, M. Rajendranathan	12	4.5	Saito, Yuichi (pat.)	19	7.86	Tozawa, Harumi	10	3.15			
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Lejura, M. Rajendranathan	4	0.5	Schindler, D. W.	28	9.19	Urano, T. (pat.)	16	6.37			
Lejura, M. Rajendranathan	14	4.60	Schmitt, Robert O. (pat.)	30	2.3						
Lejura, M. Rajendranathan	3	0.32	Schultz, Ray W. (pat.)	30	2.3						
Lejura, M. Rajendranathan	11	4.5	Schultz, V. L. (pat.)	29	3.4						
Lejura, M. Rajendranathan	12	4.5	Scoats, H. W. (pat.)	30	2.3						
Lejura, M. Rajendranathan	7	2.12	Secrist, John A., III	1	0.38						
Lejura, M. Rajendranathan	13	6.31	Sellen, D. B.	16	6.32						
Lejura, M. Rajendranathan	11	4.5	Sen, D. P.	1	0.37						
Lejura, M. Rajendranathan	5	0.6	Serebrenikova, T. P.	18	7.51						
Lejura, M. Rajendranathan	4	0.5	Shambeau, A. B. (pat.)	29	3.4						
Lejura, M. Rajendranathan	14	6.15	Shenooda, Fawzia T.	10	3.9						
Lejura, M. Rajendranathan	12	4.5	Shvydkaya, N. A.	15	6.79						
Lejura, M. Rajendranathan	24	9.14	Sikorski, Z. E.	3	0.6						
Lejura, M. Rajendranathan	21	9.13	Silver, M.	11	4.5						
Lejura, M. Rajendranathan	13	4.6	Simajchl, Vladimir	5	0.6						
Lejura, M. Rajendranathan	14	4.61	Singer, Frederick R.	2	0.39						
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Lejura, M. Rajendranathan	20	8.50	--	24	9.14						
Lejura, M. Rajendranathan	9	3.237	Sjoberg, B.	12	4.5						
Lejura, M. Rajendranathan	19	7.9	Slonimsky, G. L. (pat.)	29	2.06						
Lejura, M. Rajendranathan	30	4.82	Smith, Lynwood S.	21	9.13						
Lejura, M. Rajendranathan	5	0.6	Smith, Malcolm C., Jr.	19	7.89						
Lejura, M. Rajendranathan	12	4.5	Soares, Joseph H., Jr.	14	4.90						
Lejura, M. Rajendranathan	12	4.5	Solt, Gunther (pat.)	29	2.3						



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# Commercial Fisheries Abstracts

U.S. DEPARTMENT OF COMMERCE  
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JUNE 1972

VOLUME 25  
NUMBER 6

Seattle, Wash.



# UNITED STATES DEPARTMENT OF COMMERCE

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## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

C. F. J. [illegible]  
[illegible]  
[illegible]



0.118  
(9.19)

INSTRUMENTS FOR WATER QUALITY MONITORING

Ballinger, Dwight G. (Environmental Protection Agency, Cincinnati, OH 45202)  
Environmental Science & Technology 6, No. 2, 130-133 (February 1972)

Monitoring the environment is necessary to help define the nature and extent of pollution problems in order to develop an intelligent plan for pollution abatement. This article is a brief summary of the instruments available to industries and agencies that must monitor many water quality parameters.

[6 tables, 1 figure, 5 references]

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[5 figures, 43 references]

Powell, R. C. T., and A. A. Spark (Ministry of Agriculture, Fisheries and Food,  
Food Research Institute, Colney Lane, Norwich, NOR70F, England)

Journal of the Science of Food and Agriculture 22, No. 11, 597-599 (Nov. 1971)

This paper reports on the examination of the action of aluminum and zirconium salts in limiting the extent of color development (Maillard reaction) in a glucose-glycine model system. Certain salts of aluminum and zirconium are capable of re-

EFFECTS OF ZIRCONIUM AND ALUMINUM COMPOUNDS AND PH  
ON THE MAILLARD REACTION

0.33

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 1

0.33

INHIBITION OF FLESH BROWNING AND SKIN COLOR FADING IN  
FROZEN FILLETS OF YELLOWEY SNAPPER (LUTJANUS VIVANUS)

Thompson, Harold C., Jr., and Mary H. Thompson (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, Pascagoula, MI 39567)  
NOAA Technical Report NMFS SRF-644, 6 pp. (Feb. 1972) (National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Seattle, WA 98115) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price \$0.25.

This paper reports the results of an experiment in which fresh yelloweye snapper (scaled and eviscerated) were treated with 3,3'-thiodipropionic acid, glutathione, or disodium ethylenediaminetetraacetate dihydrate in combination with propyl gallate or monoterpenic butylhydroquinone. The treated samples were stored at -10° F. for 12 months. The purpose of this experiment was to determine whether the chemicals had any effect on the development of the browning of the flesh (Maillard reaction) of the fish. A secondary purpose was to determine the effect of vacuum packaging of the fish on the development of discoloration of the skin of the fish. [3 tables, 27 references]

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 1

0.35  
(0.5)

MECHANISM OF MERCURIC CHLORIDE RESISTANCE IN MICROORGANISMS.  
I. VAPORIZATION OF A MERCURY COMPOUND FROM MERCURIC CHLORIDE  
BY MULTIPLE DRUG RESISTANT STRAINS OF ESCHERICHIA COLI

Kôamura, Ichirô, and Kazuo Izaki (Department of Agricultural Chemistry, Faculty of Agriculture, Tohoku University, Sendai, Japan)

Journal of Biochemistry 70, No. 6, 885-893 (Dec. 1971) (Japanese Biochemical Society, Japan Academic Societies Center Bldg., 2-4-16, Yoyoi, Bunkyo-ku, Tokyo 113, Japan)

Because highly toxic mercurials are used as pesticides, information on the fate of these chemicals in the biosphere is essential. In the present study, the authors examined the metabolism of mercurials in drug-resistant strains of the bacterium E. coli. They found that the resistance to HgCl<sub>2</sub> can be transferred from a resistant strain of E. coli to sensitive strains of E. coli and Aerobacter aerogenes. The resistant strains of E. coli could grow in the presence of 0.02 mM HgCl<sub>2</sub>, but the sensitive strain failed to grow in the presence of 0.01 mM HgCl<sub>2</sub>. When the resistant strain of E. coli was cultivated in the presence of 203HgCl<sub>2</sub>, glucose, and NaCl in phosphate buffer, the cells vaporized a form of radioactive mercury; however, the sensitive strain, under the same conditions, did not show such activity. [7 figures, 4 tables, 21 references]

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 1

0.38  
(0.5)(9.19)

METALLIC MERCURY-RELEASING ENZYME IN MERCURY-RESISTANT  
PSEUDOMONAS

Furukawa, Kensuke, and Kenzo Tomomura (Fermentation Research Institute, Inage, Chiba, Japan)

Agricultural and Biological Chemistry 36, No. 2, 217-226 (Feb. 1972)

A metallic mercury-releasing enzyme, which catalyzes the reduction of organic and inorganic mercurials to metallic mercury was extracted from the cells of mercury-resistant Pseudomonas and concentrated 90-fold. The enzyme was purified from the cell-free extract of the Pseudomonas by precipitation with ammonium sulfate and repeated column chromatography on Sephadex G-150 and on DEAE-Sephadex. The purified enzyme gave a single band in electrophoresis on polyacrylamide gel, and a characteristic absorption spectrum indicative of flavoprotein. The prosthetic group of the enzyme was identified as FAD (flavin-adenine dinucleotide). Organic and inorganic mercurials were decomposed to metallic mercury by action of the enzyme in the presence of reduced NADP (oxidoreductase) generating system and cytochrome c-I.

[14 figures, 2 tables, 8 references]

FTP

Cvancara, Victor A. (Dep. Biol., Wisconsin State Univ., Eau Claire, Wis.)  
Chemical Abstracts 76, No. 3, 11430k (Jan. 17, 1972)

LIVER ARGINASE ACTIVITY IN THE SOCKEYE SALMON, ONCORHYNCHUS NEKA

0.38

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 1

IDENTIFICATION AND QUANTIFICATION OF CORTICOSTEROIDS  
IN THE ATLANTIC HALIBUT, HIPPOGLOSSUS HIPPOGLOSSUS L.

Pensabene, John W., Walter Fiddler, Calvin J. Dooley, Robert C. Doerr, and Aaron E. Wasserman (Eastern Regional Research Laboratory, U.S. Department of Agriculture, Philadelphia, PA 19118)  
*Journal of Agricultural and Food Chemistry* 20, No. 2, 274-277 (Mar-Apr. 1972)

Because of the current interest in the study of N-nitrosamines in foods, the authors prepared, for reference purposes, a compilation of some of the physical properties of these compounds such as boiling points or melting points, and gas-liquid chromatographic, infrared and mass spectral data (most of which are not available in the literature). They mention that the most extensive review on the properties of N-nitroso compounds was prepared by H. Druckrey, R. Preussmann, S. Ivankovic, and D. Schmael [Z. Krebsforsch. **69**, 103 (1967)]. Such information is useful to the analyst because the accuracy of earlier reports on nitrosamines in foods is questionable inasmuch as specific methods for confirming the identity of the nitrosamines were not utilized and a number of other food components are known to appear as artifacts in the analyses.

ДЛЯ

Chemical Abstracts 76, No. 3, 10223h (Jan. 17, 1972)

Brekhman, I. I., V. A. Gonenko, and E. Ya. Kostetskii (Inst. Biol. Act. Subst.,

ANTIRADIOMIMETIC EFFECT OF SOME COMPOUNDS EXTRACTED FROM MARINE INVERTEBRATES

0.35

### 0.32 THE CRYSTAL STRUCTURE AT 4 Å RESOLUTION

THE CRYSTAL STRUCTURE OF BONITO (KATSUO) FERROCYTOCHROME C

Ashida, Tamaichi, Tatzuo Ueki, Tomitake Tsukihara, Akio Sugihara, Tsunehiro Takano, and Masao Kakudo (Institute for Protein Research, Osaka University, Osaka, Japan)

*Journal of Biochemistry* **70**, No. 6, 913-924 (Dec. 1971) (Japanese Biochemical Society, Japan Academic Societies Center Bldg., 2-4-16, Yoyoi, Bunkyo-ku, Tokyo 113, Japan)

Cytochrome c is a one-electron carrier in the oxidation-reduction system in mitochondria. Previous work has indicated differences in the physical and chemical properties in the oxidized and reduced states of this protein. This paper provides information on the crystal structure analysis of bonito ferrocytochrome at 4 Å resolution.

ДЛЯ

[10 figures, 2 tables, 19 references]

are different. [1 figure, 1 table, 20 references]

FILE

The results presented in this report suggest that (1) K<sup>+</sup> is actively transported into the distal tubule by a Na<sup>+</sup>-dependent mechanism; (2) cotrans-

Russell, J. M., (Department of Physiology, University of Utah Medical Center, Salt Lake City, UT 84112), and A. M. Brown (Department of Physiology and Medicine, University of Utah Medical Center)

0.4  
(9.12) . ACTIVE TRANSPORT OF POTASSIUM AND CHLORIDE  
IN AN IDENTIFIABLE MOLLUSCAN NEURON

(9.12)

#### 0.4 BIOCHEMICAL ASPECTS OF CHEMICAL CARCINOGENS WITH REFERENCE TO AROMATICS AND NITROGENS

(9.6)

Den Engelse, L.  
Voedings 33 No

Voeding 33, No. 1, 17-39 (1971) (In Dutch)

BFMIRA Abstracts 25, No. 3, Abstract No. 826, 168 (Mar. 1972)

A review of the literature on nitrosamines and aflatoxins is given with 94 references, C.S.B. Reprinted

FTP

[4 figures, 4 tables, 15 references]

Part I of this series was published on pages 885-893 of the same issue of this journal. The authors concluded that NADPH, and to a lesser extent, NADH, act as electron donors for the enzymatic reduction of  $HgCl_2$  and the vaporization that occurs after this reduction by a multiple drug resistant strain of *E. coli*. The reduction of  $HgCl_2$  and the subsequent vaporization of a form of Hg seems to account for the mechanism of resistance to  $HgCl_2$  in *E. coli* strains having multiple drug resistance.

Kōmura, Ichirō, Tsukasa Funaba, and Kazuo Izaki (Department of Agricultural Chemistry, Faculty of Agriculture, Tohoku University, Sendai, Japan)  
Journal of Biochemistry 70, No. 6, 895-901 (Dec. 1971) (Japanese Biochemical Society, Japan Academic Societies Center Bldg., 2-4-16, Yoyoi, Bunkyo-ku, Tokyo 113, Japan)

0.35  
(0.5)

ACETYLCHOLINE: POSSIBLE NEUROMUSCULAR TRANSMITTER IN CRUSTACEA

0.4  
(9.12)

Futemachi, Kin J. (Department of Neurology, Stanford University School of Medicine, Stanford, CA 94305)  
 Science 175, No. 4028, 1373-1375 (Mar. 24, 1972)

This paper presents evidence that acetylcholine may be the neuromuscular transmitter to the tonic flexor muscles in crayfish.  
[2 figures, 18 references]

FTP

FTP

[2 figures, 5 tables, 25 references]

view, that cortisol is one of the major

On the basis of tentative and definitive identifications, earlier work has shown that cortisol is present in the plasma of several teleost fishes; however, only in the salmonids has there been rigorous proof of the presence of cortisol in the plasma. In the present study, cortisol and cortisone were definitely identified in the plasma of the Atlantic halibut. The authors indicate that this study extends the rigorous proof of cortisol beyond the salmonids and supports the view that cortisol is one of the major corticosteroids in teleosts.

Weisbart, Melvin, and D. R. Idler (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
General and Comparative Endocrinology 17, No. 3, 416-423 (Dec. 1971)

0.35



Carbonell, R. G., and M. D. Kostin (Department of Chemical Engineering, Princeton University, Princeton, NJ 08540)  
 AIChE Journal 18, No. 1, 1-12 (Jan. 1972)

This article is a review of representative literature on enzyme kinetics and engineering that was published from January 1969 to August 1971. The first section of the report deals with the production and purification of enzymes. It covers recent attempts to extract enzymes from microbial and vegetable sources and the possibility of artificially synthesizing enzymes. The second section deals in detail with enzyme kinetics. The authors first discuss Michaelis-Menten kinetics, then they consider the effects of pH, temperature, metal ions, inhibitors, and activators on the enzyme reaction rate. The third section reviews articles on the development of water-insoluble enzyme derivatives. Four methods of attaching enzymes to solid supports are considered: (1) covalent bonding to an insoluble carrier, (2) polymer entrapment, (3) covalent cross-linking, and (4) physical absorption. The last section discusses some of the applications of enzymes to medicine, analytical chemistry, and the chemical industry.

FTP

[200 references]

# 0.4 (9.12) 1-METHYLADELINE BIOSYNTHESIS IN STARFISH OVARY: ACTION OF GONAD-STIMULATING HORMONE IN METHYLATION

Shirai, H., H. Kanatani (Ocean Research Institute, University of Tokyo, Tokyo 164, Japan), and S. Taguchi (Division of Biology, National Institute of Radiological Sciences, Chiba, Chiba-ken 280, Japan)  
 Science 175, No. 4028, 1366-1368 (Mar. 24, 1972)

Because methionine (in its active form, S-adenosylmethionine) donates the methyl group in many biological methylations, the authors carried out a study to determine whether methionine is also a methyl donor in the synthesis of 1-methyladenine in the starfish ovary. A hormonal peptide, gonad-stimulating substance (released from the nervous system of starfishes) acts on the ovary to produce 1-methyladenine. The present results show that methionine enhances the production of 1-methyladenine in the presence of the gonad-stimulating substance (GSS); in the absence of GSS, production of 1-methyladenine is not detectable. Apparently, methionine is a methyl donor in the biosynthesis of 1-methyladenine, suggesting that gonad-stimulating substance is involved in the methylation process.

FTP

[2 figures, 16 references]

# 0.5 EFFECTS OF INCUBATION TEMPERATURE ON THE SALT TOLERANCE OF SALMONELLA

Matches, Jack R., and J. Liston (Institute of Food Science and Technology, College of Fisheries, University of Washington, Seattle, WA 98195)  
 Journal of Milk and Food Technology 35, No. 1, 39-44 (Jan. 1972)

Small numbers of salmonellae may increase to infective levels in foods if these foods have not been properly processed and stored. Earlier work has shown that salt is effective in preventing growth of salmonellae in foods. Because many foods contain low levels of salt (sublethal for Salmonellae), the present researchers examined the potential for growth of Salmonellae in the presence of salt at various temperatures. They determined the growth of *S. heidelberg*, *S. typhimurium*, and *S. derby* in nutrient broth containing 0% to 8% added NaCl (in 0.5% or 1% increments). Incubation temperatures used were 8°, 12°, 22°, and 37° C. *S. heidelberg* was also tested in the culture medium containing 0% to 9% added NaCl and at temperatures of 39°, 41°, 43°, and 45° C.

Low levels of salt stimulated growth of salmonellae; this stimulation was more pronounced at low temperatures than at temperatures near the optimum for the organisms.

Because salt is used to preserve foods, these data have serious implications in the preservation of perishable foods. Concentrations of salt sufficient to prevent the growth of salmonellae in foods stored at low temperatures may not be sufficient to prevent growth of salmonellae at higher temperatures.

FTP

[5 figures, 18 references]

# 0.5 STAPHYLOCOCCUS AUREUS AND STAPHYLOCOCCAL FOOD INTOXICATIONS. A REVIEW. II. ENTEROTOXINS AND EPIDEMIOLOGY

Minor, T. E., and E. H. Marth (Department of Food Science and the Food Research Institute, University of Wisconsin, Madison, WI 53706)  
 Journal of Milk and Food Technology 35, No. 1, 21-29 (Jan. 1972)

Staphylococcal food poisoning is an intoxication caused by a water-soluble protein (enterotoxin) secreted by the bacterial cells. Part I of this review was published in an earlier issue of this journal and covered the nature of staphylococci stressing their taxonomy, cultural and physiological characteristics, isolation, and activity in bacteriological media. In this part (II), the authors review certain aspects of staphylococcal intoxications including (1) description and general properties of the enterotoxins, (2) production of enterotoxins, (3) assays for enterotoxins, and (4) epidemiology of staphylococcal intoxications. Parts III and IV of this series will appear in subsequent issues of this journal and the last part will contain the references cited.

FTP



0.4 (0.7)  
PARTIAL CHARACTERIZATION OF LIVER PROTEINS  
FOLLOWING EXPOSURE TO MERCURY

Bryan, Sara E., and Eugene F. Hayes (Department of Biological Sciences, Louisiana State University, Lake Front, New Orleans, LA 70122)  
FEBS Letters 21, No. 1, 21-24 (Mar. 1972)

Protein induction, a selective means for regulating *in vivo* levels of proteins, is one cellular occurrence in which detoxifying proteins are increased, thus enabling an animal to adapt to higher levels of a toxic substance. Earlier work has shown that certain metals function as activating or depressing agents in the regulation of protein synthesis and protein turnover. Data presented in the present report, collected in experiments with mice, suggest that levels of mercury are tolerated under conditions which appear to involve induction-detoxification processes. The authors found that soluble proteins from mercury-treated mice increased and proteins known to contain specific binding sites for mercury are cited as possible candidates for the stimulated molecules.

FTP  
[2 figures, 1 table, 7 references]  
The authors provide in this report conclusive evidence for the involvement of bacteriophage designated DB8 in the toxigenicity of *C. botulinum* type D, South African strain. [1 figure, 2 tables, 9 references]

FTP  
Nature New Biology 235, No. 53, 16-17 (Jan. 5, 1972)

Eklund, M. W., F. T. Poyosky, and S. M. Reed (National Marine Fisheries Service, NOAA, U.S. Department of Commerce, 2725 Montlake Blvd. East, Seattle, WA 98102 U.S.A.)

0.5  
BACTERIOPHAGE AND THE TOXIGENICITY OF *CLOSTRIDIUM BOTULINUM*  
TYPE D

BIOTRANSFORMATION OF METHYL MERCURIC SALTS IN GERM FREE RATS

Norseth, Tor (Institute of Occupational Health, Gydas vei 3, Oslo 3, Norway)  
Acta Pharmacologica et Toxicologica 30, Nos. 3-4, 172-176 (1971) (Munksgaard, 9, Nørregade, DK-111 Copenhagen K, Denmark)

T. Norseth and T. W. Clarkson [Biochem. Pharmacol. 16, 767-772 (1970)] and of the carbon-mercury bond in methyl mercuric salts *in vivo* releasing inorganic mercury occurs in rats and in mice. Some earlier results also indicated that the release of inorganic mercury in the rat was caused by microorganisms in the gastrointestinal track. In the present study, therefore, the author examined the release of inorganic mercury from methyl mercuric salts *in vivo* using germ-free rats. The present studies have shown that the inhibition of growth of *C. botulinum* by sodium nitrite does vary according to the growth medium used. Care must therefore be exercised in selecting media to study the mechanism of action of sodium nitrite in commercially prepared cured meats. S.M.S. Reprinted

Johnston, M. A., and R. Loyne  
Can. Inst. Fd Technol. J. 4, No. 4, 179-184 (1971)  
BMTA Abstracts 25, No. 3, Abstract No. 729, 149 (Mar. 1972)

0.5  
INHIBITION OF *CLOSTRIDIUM BOTULINUM* BY SODIUM NITRITE  
AS AFFECTED BY BACTERIOLOGICAL MEDIA AND MEAT SUSPENSIONS

0.5  
MICROBIAL TOXINS. A COMPREHENSIVE TREATISE

Authors and titles as listed below  
Academic Press, 111 Fifth Ave., New York, NY 10003 (Dates, pages, prices listed below).

Vol. 1, "Bacterial Protein Toxins," edited by S. J. Ajl, S. Kadis, and T. C. Montie, with introduction by Dr. Alvin M. Pappenheimer, Jr. (1970), 517 pp., \$23.00 (subscription price \$19.55); Vol. 2A, "Bacterial Protein Toxins," edited by S. Kadis, T. C. Montie, and S. J. Ajl (Apr. 1971), 434 pp., \$22.00 (subscription price \$18.70); Vol. 3, "Bacterial Protein Toxins," edited by T. C. Montie, S. Kadis, and S. J. Ajl (1970), 572 pp., \$27.00 (subscription price \$22.95); Vol. 4, "Bacterial Endotoxins," edited by G. Weinbaum, S. Kadis, and S. J. Ajl (1971), 473 pp., \$26.00 (subscription price \$22.10); Vol. 5, "Bacterial Endotoxins," edited by S. Kadis, G. Weinbaum, and S. J. Ajl (Sept. 1971), 532 pp., \$27.00 (subscription price \$22.95); Vol. 6, "Fungal Toxins," edited by A. Ciegler, S. Kadis, and S. J. Ajl (Oct. 1971), 586 pp., \$29.00 (subscription price \$24.65); Vol. 7, "Algal and Fungal Toxins," edited by S. Kadis, A. Ciegler, and S. J. Ajl (Dec. 1971), 418 pp., \$22.00 (subscription price \$18.70).

The following volumes are in preparation:  
Vol. 2B, "Bacterial Protein Toxins," edited by S. Kadis, T. C. Montie, and S. J. Ajl (1972), about 150 pp.; Vol. 8, "Fungal Toxins," edited by S. Kadis, A. Ciegler, and S. J. Ajl (Mar. 1972), about 375 pp.

According to the publisher, the subscription prices for the individual volumes are valid only when orders for the complete set are received before publication of the last volume.

5.0  
EFFECT OF pH ON LOW TEMPERATURE GROWTH OF SALMONELLA

Matches, J. R., and J. Liston (Institute for Food Science and Technology, College of Fisheries, University of Washington, Seattle, WA 98195)  
Journal of Milk and Food Technology 35, No. 1, 49-52 (Jan. 1972)

This paper contains data on the ability of *Salmonella heidelberg*, *S. typhimurium*, and *S. derby* to grow at low temperatures over the pH range of from 4.0 to 6.0. The three *Salmonella* serotypes grew only over a narrow pH range between 6 and 8 at temperatures close to 5° C. The authors indicate that these results reinforce earlier published conclusions that foods held at temperatures below 5° C. will not support growth of *Salmonella*.

FTP  
[1 figure, 1 table, 10 references]

Cultures of *E. coli* were grown in minimal medium at different temperatures. The proportions of RNA, DNA, and protein were independent of the growth temperature, but the thermal resistance and fatty acid composition varied significantly. The author found a clear correlation between fatty acid composition and thermal resistance. [1 figure, 2 tables, 16 references]

Hansen, E. Wind (Royal Danish School of Pharmacy, Department of Microbiology, Universitetsparken 2, DK-2100 København Ø, Denmark)  
Dansk Tidsskrift for Farmaci 45, No. 10, 339-344 (1971) (Pharmaceutical Society of Denmark, Universitetsparken 2, DK-2100 København Ø, Denmark)

0.5  
CORRELATION OF FATTY ACID COMPOSITION WITH THERMAL RESISTANCE  
OF *E. COLI*



Heath, H. B. (Bush Boake Allen Ltd.)  
Food Manufacture 47, No. 1, 21-22, 25 (Jan. 1972)

The author estimates that by 1980 20 percent of the total manufacturing beef and 25% of the total manufacturing pork in the U.K. will have been replaced by synthetic meat. The extent to which synthetic analogues can be accepted as total replacement for long-established food products will depend upon the success technologists will have in solving the three criteria by which we judge what we are eating, namely, appearance, texture, and flavor. The physical appearance of the analogue is easily solved; the texture presents some difficulties; but the substitution of a flavor which exactly matches the natural product in the form that it is eaten presents the most difficult problem to be solved. A secondary problem relates to the restrictive legislation governing the use of chemicals in food-stuffs.

Up to now the approach to flavoring synthetic analogues has been through the use of permitted flavoring chemicals--natural and synthetic. The real success in flavoring synthetic analogues, however, will be found in the selection and adoption of flavor precursor systems which may be flavorless but will impart an aromatic effect after the correct degree of processing as it occurs in natural raw meats.

FTP

Jones, Susan B., Edwin B. Kalan, Thomas C. Jones, and J. Frederick Hazel (Eastern Marketing and Nutrition Research Division, U.S. Department of Agriculture, Philadelphia, PA 19118)  
Journal of Agricultural and Food Chemistry 20, No. 2, 229-232 (Mar.-Apr. 1972)

In this paper, the authors describe the preparation of an iron polyphosphate-protein powder from cheese whey by means of a precipitation technique using "ferripolyphosphate," a complex of ferric ions with a long-chain polyphosphate. The soluble ferripolyphosphate complex was prepared as follows: Ferric chloride solution (0.5 M) was made at room temperature from reagent grade solid iron(III) chloride hexahydrate and distilled water. A solution, containing 3 M sodium phosphate monomer, was prepared at room temperature by dissolving 30.6 g. of unadjusted powdered Calgon in distilled water to give 100 ml. of solution. The iron and phosphate solutions were mixed quickly in a blender.

The ferripolyphosphate solution precipitated practically all the protein in commercial acid whey at pH 3.2-4.0. The typical whey protein precipitate contains 22% protein, 12% iron, 39% P<sub>2</sub>O<sub>5</sub>, and 5% calcium. The lyophilized protein product is white and fluffy, and has a mildly acidic flavor. The authors suggest that ferripolyphosphate appears to be a useful reagent for the recovery of nutritious proteins from whey. Also, the proteins can be obtained in a form containing 12-15% iron (useful for enrichment of foods with iron).

[3 figures, 4 tables, 10 references]

FTP

0.7 THE ECONOMIC IMPLICATIONS OF MALNUTRITION: THE DISMAL  
SCIENCE REVISITED

Belli, Pedro (Present address: Instituto Centroamericano de Administracion de Empresas, Managua, Nicaragua)  
Economic Development and Cultural Change 20, No. 1, 1-23 (Oct. 1971)

The author's purpose, in this article, was to point out the economic implications of malnutrition in the hope of generating research in this area. In his analysis, he concludes that the nutritional level of a country may have important consequences for its rate of economic growth. Suggested areas of research include assuming that there are diminishing returns to nutrition, at what point do the marginal costs surpass marginal benefits, (2) what alternatives should be selected in the distribution of limited food resources, and what kind of for-

[3 tables, 37 references, appendix 1]

DLA  
The author describes a settling tank system for handling wastes from a trout farm. [6 figures, 1 illustration]

FTP

0.8 TAKING CARE OF WASTES FROM THE TROUT FARM  
(9.16)

Jensen, Raymond (Bureau of Sports Fisheries and Wildlife, U.S. Department of the Interior, St. Paul, MN 55101)  
American Fishes and U.S. Trout News 16, No. 5, 4-6, 21 (Jan.-Feb. 1972)

## 1.0116 HISTORY AND STATUS OF NORTH CAROLINA'S MARINE FISHERIES

Godwin, Walter F., Michael W. Street, and Thomas R. Rickman

North Carolina Department of Conservation and Development, Division of Commercial and Sports Fisheries, Raleigh, N.C., Information Series No. 2, 77 pp. (July 1971). Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10083.

NOAA Publications Announcement No. 72-5, Item 72-05-16-08, 6 (Feb. 1972)

Commercial and sports fishing are reviewed and a management philosophy is given. Marine Research organizations are briefly described, and important marine fisheries research is briefly reviewed. The Oyster Rehabilitation Program is described and assessed. Four major problem areas (habitat, stocks, products, people) are defined. (Authors' abstract, mod. by SK)

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Existing information on species composition, distribution, and availability of commercially important bottom fishes found on the Continental Shelf was compiled and evaluated. (Authors' abstract in part)

Reprinted

NOAA Publications Announcement No. 72-5, Item 72-05-16-02, 4 (Feb. 1972)

Reprinted

1.0116 AN INVESTIGATION OF THE OFFSHORE DEMERSAL FISH RESOURCES  
OF SOUTH CAROLINA

Bearden, Charles M., and Michael D. McKenzie

Technical Report No. 2, 19 pp. (May 1971) (South Carolina Wildlife Resources Department, Marine Resources Division, Charleston, S.C.) Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10053.



0.7 SELENIUM: RELATION TO DECREASED TOXICITY OF METHYLMERCURY ADDED TO DIETS CONTAINING TUNA (9.19)

Ganther, H. E. (Department of Nutritional Sciences, University of Wisconsin, Madison, WI 53706), C. Goudie, M. L. Sunde, M. J. Kopecky, P. Wagner, Sang-Hwan Oh, and W. G. Hoekstra

Science 175, No. 4026, 1122-1124 (Mar. 10, 1972)

The authors report the surprising finding that tuna in the diet decreases the toxicity produced with high concentrations of methylmercury.

Tuna and swordfish are able to accumulate mercury in excess of 0.5 p.p.m. (the maximum level allowable in such fish used for food). This tendency on the part of these fish raised two questions in the authors' minds: (1) How toxic is a low concentration of Hg when ingested with the tuna? and (2) What factors present in tuna might cause Hg to accumulate or might modify its toxicity? The researchers are engaged in a study of the long-term effects of various concentrations of Hg in diets containing tuna. In the present experiments, they fed Japanese quail 20 p.p.m. of mercury (as methylmercury) in diets containing 17% by weight of tuna or in diets containing corn-soya. Control samples of both groups of diets contained no added methylmercury.

The authors found that Japanese quail given 20 p.p.m. of mercury in the diets containing the tuna survived longer than quail given the same amount of mercury in a corn-soya diet. Apparently, tuna has a relatively high content of selenium and tends to accumulate additional selenium when mercury is present.

In further tests with rats, the authors found that, when the selenium content in the diet was comparable to that supplied by tuna, the toxicity of methylmercury to the rats was lowered. They conclude that selenium in tuna, far from being a hazard in itself, may lessen the danger to man of mercury in tuna.

[1 figure, 1 table, 13 references]

9.0 FACTORS INFLUENCING FLAVOUR REQUIREMENTS

Pannell, R. R. H. J. (White Tomkins Ltd., Food Manufacturing 47, No. 1, 37, 48 (Jan. 1972)

Although the main factor influencing the flavor requirements of a food is the consumers' preference, the author points out many technical factors that are also important. These other factors influence strongly the direction and growth of the food industries and the nature of their industrial research and development programs. The author indicates that new food processes are being held back only by the enormous cost of launching a new product, by inflation, and by the lack of investment brought about by a general lack of confidence in world trade. The author classifies some of the various factors that influence flavor requirements of foods as follows: (1) Growth of foreign travel, (2) Introduction of new raw materials, (3) Development of new processing techniques, (4) Demand for convenience foods, (5) Interest in "savories" (snacks, meat pies, textured protein, smoked meats), (6) Lack of international agreement on flavor additives in foods, (7) Regulations relative to the safety of flavor and other additives, and (8) The development of "health foods."

Seafood flavor is imparted to foodstuffs by the addition of 2,4-pentadienal and, if desired, of an oxazoline.

FTP

1.0118 PROBLEMS, PRIORITIES, AND RESEARCH NEEDS OF NORTH CAROLINA'S MARINE FISHERIES

Godwin, Walter F., Michael W. Street, and Thomas R. Rickman

North Carolina Department of Natural and Economic Resources, Division of Commercial and Sports Fisheries, Raleigh, N.C.; Information Series No. 4, 41 pp. (July 1971). Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10084. NOAA Publications Announcement No. 72-5, Item 72-05-16-14, 7 (Feb. 1972)

Four major problem areas are defined: habitat, stocks, products, and people. Specific problems in each area are given and research needs presented. Priorities are established for needed research in each problem area, and the agencies best suited to conduct the research are suggested. Plans, including general objectives and methods, annual time tables, and estimated costs are given for proposed research activities by the Division of Commercial and Sports Fisheries for the next 5 years. (Authors)

Reprinted

FTP

0.8 MOBILE CARRYING SYSTEMS FOR DEPOSITING LOADS ON THE OCEAN BOTTOM

Serrano, Francisco M. (Paris, France); assignor to Compagnie Francaise des Petroles, Paris (pat.)

U.S. Patent 3,633,529

Official Gazette of the U.S. Patent Office 894, No. 2, 553 (Jan. 11, 1972)

This submarine delivery system carries and deposits heavy loads at precise locations on the ocean bottom. The control system may be entirely contained in the submarine or control signals may be supplied by a surface vessel linked to the submarine by an electronic power and communication cable.

FTP

0.8 TOXIC FOODS AND UNBALANCED FEEDING PATTERNS

Tremolieres, J.

Cah. Nut. Diet. 9, No. 3, 59-62 (1971) (In French)

BFMIRA Abstracts 25, No. 3, Abstract No. 841, 171 (Mar. 1972)

The author considers Man as living in symbiosis with his environment. His dependence on his environment for food means that material is consumed containing substances necessary to plants, bacteria, fungi and etc. but foreign and sometimes harmful to Man's metabolism. Substances foreign to human metabolism considered include heavy metals, elements homologous to elements normally present in the cells, enzyme system modifiers, membrane modifiers and substances capable of intervening in nuclear biosynthesis. Also considered are those substances that normally can be used by the tissues but which become toxic when ingested in large amounts (for example alcohol) and normal nutrients in which a disequilibrium is injurious (for example vitamins A and D). L.P.

Reprinted

FTP

0.8 PROCESS FOR CLEANING UP OIL SPILLS (9.19)

Kaiser, Robert (Cambridge, Mass.); assignor to Avco Corp., Cincinnati, Ohio (pat.)

U.S. Patent 3,635,819

Official Gazette of the U.S. Patent Office 894, No. 3, 1094 (Jan. 18, 1972)

Oil spills on open bodies of water are controlled by dispersing a hydrocarbon base ferrofluid containing an oil soluble, water insoluble, surfactant and a stable colloid of magnetic solids, and then using a magnetic field to attract and pick up the oil spill.

FTP





TOXICOLOGICAL AND PHARMACOLOGICAL STUDIES ON  
SEA ANEMONE, CALLIACTIS POLYPUS (HORMATHIIDAE)

Huang, C. L., and G. N. Mir (Department of Pharmacology, School of Pharmacy, University of Mississippi, University, MS 38677)  
Journal of Pharmaceutical Sciences 61, No. 1, 66-69 (Jan. 1972)

The toxin from the tentacles of C. polypus was toxic to mice, having an LD<sub>50</sub> of 32 mg/kg. The toxin appears to have CNS (Central nervous system) depressant action and also it reduced the motor activity in mice.

[2 figures, 1 table, 15 references]

# THE PROBLEM OF THE ORIGIN OF TROPICAL ICTHYOSARCOTOXICITY

Ehrhardt, J.-P.

Annals Falsif. Expert. Chim. 64, No. 695, 100-114 (1971) (In French)  
BFMIRA Abstracts 25, No. 3, Abstract No. 833, 170 (Mar 1972)

The epidemiology of ciguatera and ciguatera-type intoxications (poisoning associated with the ingestion of certain seafoods) is discussed. C.C.F. Reprinted

## References

## SHRIMP-DEHEADING MACHINE

Zober, Ben P. (1364 S. Edgewater Drive, Charleston, SC 29407), and Arthur G. Teston, Jr. (P.O. Box 181, Hollywood, SC 29449) (Pat.)  
U.S. Patent 3,629,904 (Dec. 28, 1971)

# FISH LINE REELING AND BAITING APPARATUS

2.1477

Tison, Kenneth F. (Crescent City, CA 95531); assignor to Marine Construction Design Co., Seattle, Wash. (pat.)  
U.S. Patent 3,626,630

This is a semi-automatic line handling and baiting system for commercial fishing.

## TROTLINE RUNNER

2.1477

Osborne, Twin W. (Del City, Okla.); assignor of fractional part to Raymond E. Theimer, Oklahoma City, Okla.) (pat.)  
U.S. Patent 3,626,627

The fishhook has a long shank bent at a right angle.

FTP

## FISH PACKAGING

Knutrud, L. B.; Frionor Norsk Frossensfisk A/L (pat.), U.S. Patent 3,615,720  
Food Technology 26, No. 2, 60 (Feb. 1972)

Packageofillets are subjected to vacuum treatment to remove air voids between the fillets.

# SHARK DART ELECTRONIC CIRCUIT

Blanc, Clarence G. (Escandido, CA 92025); assignor to U.S. Secretary of the Navy) (pat.)  
U.S. Patent 3,626,626  
Official Gazette of the U.S. Patent Office 893, No. 2, 434 (Dec. 14, 1971)

The device couples an immobilizing electromotive force to the interior of a marine predator's body via a pathway between a blade-like electrode embedded in the predator's body, ambient sea water, and a return electrode. FTP

FTF

## MAKING AND MENDING NETS. PART FOUR: FINISHING THE WINGS AND BEGINNING ASSEMBLY

2.1121

Buckingham, Harry  
World Fishing 21, No. 1, 18-19, 25 (Jan. 1972)

the sections of the net. [4 figures]

## 2.43

Knutrud, L. B.; Frionor Norsk Frossensfisk A/L (pat.), U.S. Patent 3,615,720  
Food Technology 26, No. 2, 60 (Feb. 1972)

Packageofillets are subjected to vacuum treatment to remove air voids between the fillets.



Farragut, Robert N. (Fishery Products Laboratory, National Marine Fisheries Service, Pascagoula, MI 39567)  
NOAA Technical Report NFSS SRF-650, 12 pp. (Feb. 1972) (National Marine Fisheries Service, Washington, DC 20235) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 0320-0032, Price \$0.25.

Spanish mackerel were treated with antioxidant solutions containing BHA and BHT, Tenox 4, BHA, BHT, PG, citric acid, and propylene glycol (Tenox 6); Tenox 4 plus EDTA; Tenox 6 plus EDTA; Ca(Na<sub>2</sub>EDTA); Ca(Na<sub>2</sub>EDTA); and (Na<sub>2</sub>EDTA)EDTA. Both dipping and injecting methods. Samples analyzed at 3-month intervals showed filllets packed in vacuum and treated with EDTA remained in good condition over the 12-month storage period. However, samples treated with EDTA remained superior to other samples throughout the storage period.

Authors' abstract

[6 figures, 7 references]

Hughes, P. (Taylor Instrument Companies (Europe) Ltd.)  
Food Manufacture 77, No. 2, 28-27, 19 (Feb. 1972)

This is the third article dealing with the retorting process. The previous two articles were published in the November and the December 1971 issues of the journal. They discussed the instrumentation techniques for each stage of the retorting process necessary to ensure that the correct processing is carried out. In the present article, the author discusses the instrumentation fully automatic retort control systems. He defines fully automatic retort control systems as those systems in which operator participation is confined to loading and unloading the retort and to checking the process by actuating a simple push button after the operator has checked that the retort is at the correct temperature, pressure, cook hold time, and cool down time. The various sections of the instrumentation used, instrument presentation, and the correct settings on the instrumentation. The instrumentation used, instrument presentation, and the correct settings on the instrumentation.

Fig 91

Flaumenbaum, B. L., and S. A. Artyukhova (Odessa. Tekhnol., Inst. Pishch. Khim. Prom., Odessa, U.S.S.R.)  
Chemical Abstracts 76, No. 1, 2624z (Jan. 3, 1972)

3.337 FACTORS DETERMINING CHANGES IN THE F-EFFECT DURING THE  
STERILIZATION OF CANNED FISH

Teshima, Shin-ichi, Akio Kanazawa, and Tetsuo Ando (Laboratory of Fisheries Chemistry, Faculty of Fisheries, University of Kagoshima, Japan)  
Comparative Biochemistry and Physiology 41, 1B, 121-126 (Jan. 15, 1972)

The C<sub>26</sub>-sterol isolated from the clam was identified as 22-trans-24-norcholestra-5,22-diene-3 $\beta$ -ol.  
[4 figures, 28 references]

Figures, 1 table, 6 references

Vaver, and L. D. Bergelson (Institute for Chemistry of Natural Products, Academy of Sciences, Moscow, U.S.S.R.)  
Chemistry of Lipids 1, No. 8, 98-108 (Jan. 1972)

Aliphatic derivatives of dihydric alcohols may exist in various animal, plant, and microbial lipids. No organisms have been found whose lipids under ordinary conditions constitute a major portion of the overall lipid content. In this article, the authors present data to show that some marine invertebrates of the Echinodermata and Mollusca families have lipid contents comparable with or even exceeding those of the neutral lipids.

Fessmann, Gerhard (Mozartstr 16, Fellback, Stuttgart, Germany) (pat.)  
U.S. Patent 3,634,108  
Official Gazette of the U.S. Patent Office 894, No. 2, 696 (Jan. 11, 1972)

The smoking fluid is prepared by contacting finely divided wood chips with superheated steam. Oxygen may be introduced with the superheated steam or may be used on the smoking medium drawn off the thermally decomposed wood chips.

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of a carcinogenic nature is also presented. C.C.E.

Miler, K. B. M., and Z. P. Kozlowski  
Rev. Conserve 28, No. 2, 122-126 (1971) (In French)  
BFMIRA Abstracts 24, No. 6, Abstract No. 1751, 366 (June 1971)

<p>3.6 DEHYDRATION OF FOOD PRODUCTS. A REVIEW</p> <p>Holdsworth, S. D. (Fruit and Vegetable Preservation Research Association, Chipping Campden, Gloucestershire, England)</p> <p>Journal of Food Technology <u>6</u>, No. 4, 331-370 (December 1971)</p> <p>This review covers the physical aspects of drying food products and their significance in the preservation of the organoleptic properties of the food. It is limited to material not covered in previous reviews and contains the more recent information, as well as an extensive bibliography. References to earlier literature on dehydration are given in E. A. Baker and D. J. Foskett "Bibliography of Food," Butterworths Scientific Publication, London (1958); supplementary information is given in W. H. Bickle "Bibliography of Industrial Drying," (3 volumes) (696 references to food), D.S.I.R., H.M.S.O., London. A bibliographical guide was prepared by the present author (S. D. Holdsworth, "Bibliographical Guide to Dehydration and Dehydrated Products," F.V.P.R.A., Chipping Campden, Glos.). The author further indicates that the major text books on dehydration of foods are: H. W. Von Loesecke, "Drying and Dehydration of Foods," 1st edition (1943), 2nd edition (1945), Reinhold Pub. Corp., New York; T. N. Morris, "Dehydration of Food," Chapman and Hall, London (1947); and W. B. Van Arsdel and M. J. Copley (editors) "Food Dehydration," Vol. 2. Products and Technology, AVI Pub. Co. Inc., Westport, Conn. (1964). An important theme of this review is the usefulness of the basic study of the transport process [heat transfer, mass transfer (moisture diffusion), and momentum transfer] (fluid flow) in relation to the design, development, and operation of processing equipment.</p> <p>[1 figure, 2 tables, 298 references]</p> <p>FTP</p>	<p>4.5 MICROSOMAL LIPID PEROXIDATION: MORPHOLOGICAL CHARACTERIZATION</p> <p>Arstila, A. V., Mary A. Smith, B. F. Trump (Department of Pathology, University of Maryland School of Medicine, Baltimore, MD 21201)</p> <p>Science <u>175</u>, No. 4021, 530-533 (February 4, 1972)</p> <p>Various workers have shown earlier that lipid peroxidation occurs, in vitro, when liver mitochondria or microsomes are incubated in the presence of redox agents such as ferrous ions, mercurial compounds, hemoproteins, ascorbate, and cystamine. The morphological alterations that occur in peroxidation have not been characterized. Such information would help us to understand the pathogenesis of peroxidation lesions and would provide new means for detecting lipid peroxidation in intact tissues, in which lipid peroxidation end products may be rapidly metabolized. The present authors, therefore, studied the morphological alterations which occur in microsomes during in vitro peroxidation. For this study, they used the hepatic microsomal fraction, in as much as the endoplasmic reticulum is especially vulnerable to peroxidation (because it contains an electron-transfer system that can catalyze lipid-peroxidation reactions).</p> <p>The researchers found that lipid peroxidation of liver and kidney microsomes induces a highly characteristic sequence of morphological changes typified by detachment of ribosomes and formation of large aggregates of vesicles bound together by dense amorphous material and myelin figurelike debris. Further, the trilaminar structure of the membrane is retained even after complete peroxidation, although its spacing may be increased. They indicate that the aggregates resemble lysosomal lipofuscin pigment as well as the membranous aggregates of endoplasmic reticulum seen in the liver after carbon tetrachloride poisoning.</p> <p>[3 figures, 27 references]</p> <p>FTP</p>
<p>3.17 SHELLFISH PRESERVATION</p> <p>Kosuge, K., K. Yamaguchi, and T. Nakamura (pat.)</p> <p>Japanese Patent 29185/71</p> <p>Food Technology <u>26</u>, No. 1, 81 (January 1972)</p> <p>The shellfish are preserved by treating them with cold water or ice at a pH of from 7.8 to 9.8.</p> <p>FTP</p>	<p>3.2342 (0.8)</p> <p>PROTOTYPE DEVELOPMENT OF AN IMMERSION FREEZER FOR FANCY MEATS IN MONOPROPYLENE GLYCOL</p> <p>Frazerhurst, L. F., D. P. Haughey, and L. G. Wyborn (Meat Industry Research Institute, New Zealand)</p> <p>Refrigeration and Air Conditioning <u>75</u>, No. 887, 51, 52, 54, 55, 57 (Feb. 1972)</p> <p>This paper contains a description of the design, development, and testing of a prototype plant of an automatic packaging and immersion freezing system for encapsulated portion-controlled units of fancy meats. The portion-control units are packaged in tight moisture and freezing medium impermeable film. Strips of the packaged units are frozen in a 50% solution of monopropylene glycol.</p> <p>The authors present data on heat transfer coefficients, freezing times, and optimum processing conditions. The economics of the process was evaluated. The data indicated that there was only a marginal increase in total cost for this new process compared to conventional processes. The authors state that the process has considerable potential and is worthy of commercial development.</p> <p>[3 figures, 3 tables]</p> <p>FTP</p>
<p>3.17 SHELLFISH PRESERVATION</p> <p>Kosuge, K., K. Yamaguchi, and T. Nakamura (pat.)</p> <p>Japanese Patent 29185/71</p> <p>Food Technology <u>26</u>, No. 1, 81 (January 1972)</p> <p>The shellfish are preserved by treating them with cold water or ice at a pH of from 7.8 to 9.8.</p> <p>FTP</p>	<p>3.2383</p> <p>MINIMUM REQUIREMENTS OF FOOD PACKAGES (FISH)</p> <p>Heiss, R.</p> <p>Verpack.-Rdsch. <u>21</u>, No. 9, Techno-scientific suppl., p. 71 (1970) (In German)</p> <p>BFMRA Abstracts <u>24</u>, No. 6, Abstract No. 1845, 381 (June 1971)</p> <p>"Recommendations are given for the portion packaging of deep-frozen fish under the headings of general requirements of the package, particular susceptibilities, specific requirements of the package, experience with existing packages used in the industry, and preservation of the packaged product." Reprinted</p>



6.190	COMPARATIVE STUDIES ON THE NUTRITIVE VALUE OF DOMESTIC AND IMPORTED FISH MEAL IN BROILER RATIONS	11	PAGE	6	VOL	25	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Han, I. K., K. I. Kim, and N. H. Lee K. J. Animal Science <u>13</u>, No. 1, 56-60 (1971) Korean Scientific Abstracts <u>6</u>, No. 1, Item (71/622), 182 (Dec. 1971)</p> <p>In tests with broiler chicks, the authors found no difference between domestic and imported meals when judged on the basis of growth rate of the chicks. The moisture content of the domestic meal was over twice that of the imported meal. [Original article has 2 figures, 6 tables, 13 references]</p>									
6.32	FATTY ACID COMPOSITION OF UNICELLULAR STRAINS OF BLUE-GREEN ALGAE	11	PAGE	6	VOL	25	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Kenyon, C. N. (Department of Bacteriology and Immunology, University of California, Berkeley, CA 94720) Journal of Bacteriology <u>109</u>, No. 2, 827-834 (Feb. 1972)</p> <p>The chloroplast fatty acids of eukaryotic algae and of vascular plants are mostly polyenoic acids; <math>\alpha</math>-linolenic acid (18:3<math>\alpha</math>) is found almost exclusively in chloroplasts and is a major constituent in the leaf tissues of higher plants and in certain groups of algae [B. W. Nichols, in <i>Phytochemical Phylogeny</i>, J. B. Harborne (editor), Academic Press, Inc., New York, N.Y. (1970), pp. 105-118]. The bacteria (including the purple and green bacteria) contain almost exclusively saturated fatty acids and monounsaturated fatty acids in their cellular lipids. The author carried out the present study on the nature of cellular fatty acids of blue-green algae as a matter of comparative biochemical interest.</p> <p>The fatty acids of 34 strains of unicellular blue-green algae provisionally assigned to the genera <i>Synechococcus</i>, <i>Aphanocapsa</i>, <i>Gloeocapsa</i>, <i>Microcystis</i>, and <i>Chlorogloea</i> were chemically characterized. Twenty strains fell into the group characterized by one trienoic fatty acid isomer (<math>\alpha</math>-linolenic acid); seven strains fell into a group characterized by another trienoic acid isomer (<math>\gamma</math>-linolenic acid). All the strains contained glycolipids with properties of diglycerides. [8 tables, 22 figures, 13 references]</p>									
6.190	DETERMINATION OF THE NUTRITIONAL VALUE OF FISH MEAL PROTEIN	11	PAGE	6	VOL	25	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Velarde, E. (Lab. Quím., Pontif. Univ. Catol. Peru, Lima, Peru) Chemical Abstracts <u>76</u>, No. 3, 13075x (Jan. 17, 1972)</p>									

4.11	GAS-LIQUID CHROMATOGRAPHIC FRACTIONATION OF NATURAL DIGLYCERIDES ON STABILIZED POLYESTER LIQUID PHASES	11	PAGE	9	VOL	52	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Kuksis, A. (Banting and Best Department of Medical Research, University of Toronto, Toronto 101, Canada) Journal of Chromatographic Science <u>10</u>, No. 1, 53-56 (Jan. 1972)</p> <p>The researchers were able to resolve 1,2(2,3)-diglyceride mixtures according to their molecular weight and degree of unsaturation by gas chromatography on 180 cm. columns containing 3% cyclohexanemethanol succinate or 3% neopentylglycol succinate in the packing. [2 figures, 1 table, 10 references]</p>									
6.54	SOLUBLE FISH POWDER	11	PAGE	9	VOL	52	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Nihon Kagakushiryo KK (pat.) Japanese Patent 33685/71 Food Technology <u>26</u>, No. 2, 60 (Feb. 1972)</p> <p>Soluble fish material is absorbed on chaff or bran, and the product is then dried.</p>									
7.47	GAUGING RESIDUAL HEADSPACE OXYGEN	11	PAGE	9	VOL	52	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Spiehler, Vina (Scientific Instruments Division, Beckman Instruments, Inc., Fullerton, Calif.) Modern Packaging <u>45</u>, No. 3, 46, 48, 50, 52, 54 (Mar. 1972)</p> <p>A new system for the simple, rapid and accurate measurement of oxygen in the headspace of packages is described. Whole packages, with or without product, can be tested. The system does not require specially constructed chambers or sampling systems. The system consists of a precision oxygen analyzer and built-in low-volume sampling accessory. Additional accessories are used to sample headspace in a variety of containers. A paramagnetic oxygen analyzer is used as the detector; it allows precise determination of oxygen concentrations in the presence of other gases. The system requires a small internal volume (4 cc.) and it is highly precise (0.5% oxygen). Greater precision may be obtained by using another model of the oxygen analyzer. [3 figures, 3 tables, 6 references]</p>									
7.0	DETERMINATION OF RELIABILITY IN MARINE CHEMISTRY BY MEANS OF INTERCALIBRATION AND STATISTICS	11	PAGE	9	VOL	52	NO	11	COMMERCIAL FISHERIES ABSTRACTS
<p>Palmork, Karsten H. (Inst. Mar. Res., Dir. Fish., Bergen, Norway) Chemical Abstracts <u>76</u>, No. 8, 37208u (Feb. 21, 1972)</p>									

<p>6.54 (3.12)</p> <p>FISH PASTE PRESERVATION</p> <p>Horikawa, H., S. Kurihara et al. (pat.) Japanese Patent 30779/71 Food Technology <u>26</u>, No. 1, 81 (January 1972)</p> <p>Crushed fish meat is pressed at a temperature below 50° C. and the juice obtained is boiled to coagulate insoluble protein. The resultant liquid component is added to fish paste products.</p> <p>FTP</p> <p>FISH FLOUR PRODUCT</p> <p>Salomon, A. (pat.) Canadian Patent 882,620 Food Technology <u>26</u>, No. 1, 81 (January 1972)</p> <p>Protein rich foods are prepared from fish flour.</p> <p>FTP</p> <p>Naturally brewed soy (heated to inactivate protease) is added to fish paste products to improve their odor and flavor.</p> <p>FTP</p> <p>6.54 FISH FLAVOR IMPROVEMENT</p> <p>Kikatsu Shoten KK; Hiroshima Shoyo KK (pat.) Japanese Patent 29186/71 Food Technology <u>26</u>, No. 1, 81 (January 1972)</p>	<p>7.1</p> <p>CHITIN AND CHITOSAN AS CHROMATOGRAPHIC SUPPORTS AND ABSORBENTS FOR COLLECTION OF METAL ION FROM ORGANIC AND AQUEOUS SOLUTIONS AND SEA WATER</p> <p>Muzzarelli, Maria Gertrude (Nee Weckx, Casella Postale 693, Bologna 40100, Italy) (pat.) U.S. Patent 3,635,818 Official Gazette of the U.S. Patent Office <u>894</u>, No. 3, 1093 (January 18, 1972)</p> <p>Chitin is used as a chromatographic chelating support and absorbent for the collection and for the separation of the metal ions from aqueous and organic solutions and from sea water.</p> <p>FTP</p> <p>-----</p> <p>The main part of the article is concerned with a description of two methods of determining mercury by atomic absorption spectrophotometry. The first method uses electrolysis to liberate the mercury from solutions. The second method uses reduction by steamous chloride to liberate the mercury. The results obtained using the two methods are discussed and it is recommended that the reduction method be used for analysis of biological materials when the sample size is not limited and that the electrolysis method be employed when only micro-quantities are available. C.C.E.</p> <p>Reprinted</p> <p>-----</p> <p>7.42 DETERMINATION OF MERCURY BY ATOMIC ABSORPTION SPECTROPHOTOMETRY</p> <p>Cumont, G. Amis Falsif. Expert. Chim. <u>64</u>, No. 695, 115-133 (1971) (In French) BEMIRA Abstracts <u>25</u>, No. 3, Abstract No. 685, 140 (Mar. 1972)</p>
<p>6.37 CHLORELLA EXTRACT</p> <p>Chlorella Inc. Co. Ltd. (pat.) Japanese Patent 24596/71 Food Technology <u>26</u>, No. 1, 84 (January 1972)</p> <p>An aqueous extract of chlorella duckweed is boiled and the precipitated protein is removed. The liquid component is added to salt and the mixture is dried. FTP</p> <p>FTP</p> <p>-----</p> <p>2 tables, 18 references</p> <p>-----</p> <p>6.39 PROTEIN QUALITY OF SOME FRESH-WATER ALGAE</p> <p>Schlichting, Harold E., Jr. (Botany Department, North Carolina State University, Raleigh, NC 27607) Economic Botany <u>25</u>, No. 3, 317-319 (July-September 1971)</p> <p>Fresh-water algae are not, at present, of economic value as fertilizer or as food for livestock or humans. However, fast growing algae mass cultured in sewage, pulped garbage, or other wastes for the production of protein or other organic compounds may be important in the future. In this article, the author reports the content of 19 amino acids in five species of fresh-water green algae (<i>Pithophora</i> sp., <i>Pediastrum</i> sp., <i>Cylindrocapsa brebissonii</i>, <i>Staurastrum cristatum</i>, and <i>Mesotaenium kramstai</i>).</p> <p>FTP</p>	<p>7.24</p> <p>THE DETERMINATION OF MERCURY BY ATOMIC-ABSORPTION SPECTROPHOTOMETRY WITH THE "DELVES SAMPLING CUP" TECHNIQUE</p> <p>Clark, D., R. M. Dagnall, and T. S. West (Department of Chemistry, Imperial College of Science and Technology, London, S.W. 7, England) Analytica Chimica Acta <u>58</u>, No. 2, 339-346 (Feb. 1972)</p> <p>The researchers evaluated the use of the absorption tube and crucible method of atomization [H. T. Delves, Analyst <u>95</u>, 431 (1970)] for the atomic-absorption determination of mercury in small sample volumes. A double absorption peak was obtained for mercury. The limit of detection of mercury with a 5-<math>\mu</math>l. sample volume and a triple-row capillary hydrogen diffusion flame was 0.17 ng.</p> <p>[3 figures, 1 table, 18 references]</p> <p>FTP</p> <p>-----</p> <p>7.42 IDENTIFICATION AND DETERMINATION OF METHYL MERCURY COMPOUNDS IN FISH BY USING COMBINATION GAS CHROMATOGRAPH-MASS SPECTROMETER</p> <p>(61.9)</p> <p>Johansson, B., R. Ryhage, and G. Westoo Acta chem. scand. <u>24</u>, No. 7, 2349-2354 (1970) BEMIRA Abstracts <u>24</u>, No. 11, Abstract No. 3568, 725 (November 1971)</p> <p>Reprinted</p> <p>Description of the method is given. H.M.S.</p> <p>-----</p> <p>7.42 DETERMINATION OF MERCURY IN FOODS, INDUSTRIAL WASTES, AND DRINKING WATER BY FLAMELESS ATOMIC ABSORPTION</p> <p>Cavallaro, Aldo, Giuseppe Elli (Lab. Chim. Prov. Milano, Milan, Italy) Chemical Abstracts <u>76</u>, No. 8, 41528c (Feb. 21, 1972)</p>



7.522 DETERMINATION OF NANOMOLAR QUANTITIES OF FREE AMINO ACIDS  
(8.51) DISSOLVED IN NORTH ATLANTIC OCEAN WATERS

Pocklington, Roger (Atlantic Oceanographic Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada)  
Analytical Biochemistry 45, No. 2, 403-421 (Feb. 1972)

In this paper, the author describes a new gas-chromatographic method for determining amino acids that gave complete separation of small samples quickly and quantitatively. He used a one-step reaction, trimethylsilylation, to prepare volatile derivatives for injection in the gas chromatograph. Conditions are described for the detection of as little as 10<sup>-11</sup> mole of all the protein amino acids, except arginine and histidine, plus many nonprotein amino acids. Although the techniques were developed to determine dissolved free amino acids of sea water, the author believes that the techniques are more widely applicable (for example, to the determination of amino acids in plasma and urine).

The paper contains data on the concentrations of 15 individual amino acids in North Atlantic Ocean water samples taken from the surface to a depth of 5,400 meters. The concentrations of the individual amino acids were nonuniform and showed statistically significant variations with depth.

[2 figures, 7 tables, 29 references]

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 13

7.57 COMPARATIVE ANALYSIS OF THE RESULTS OF DETERMINATION OF LIPIDS  
IN FISHES BY THE METHODS OF SOXHLET AND FOLCH

Shabalina, A. A. (Laboratory of the Physiology of Fishes, State Research Institute for Lake and River Fisheries, Leningrad, U.S.S.R.)  
Journal of Ichthyology 11, No. 1, 85-88 (1971) (Published by the American Fisheries Society in cooperation with Scripta Publishing Corp., 1511 K Street, N.W., Washington, DC 20005)

Comparison was made of the determination of total lipids of fishes by the method of Soxhlet [S. V. Rushkovskiy, Iz. Kubano-Chernomorsk. n.-i. inst., No. 48 (1927)] and the method of Folch (J. Folch, J. Ascoli, M. Lees, J. A. Meath, and F. N. le Baron, "Preparation of lipid extracts from brain tissue," J. Biol. Chem. 191, No. 2, (1951)]. The author found no significant differences in results obtained by both methods for the total fat content of trout underyearlings and yearlings. However, he states that the method of Folch must be used for the determination of lipid in fish organs and fish tissues (muscles, liver, blood serum, eggs).

DLJ

Chemical Abstracts 75, No. 7, 4/579j (August 16, 1971)

7.44 ACCURATE DETERMINATION OF TOTAL VOLATILE NITROGEN  
IN MEAT AND FISH

Pearson, D., and M. Muslemuddin (Nat'l. Coll. Food Technol., Univ. Reading, Weybridge/Surrey, England)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 13

7.9 GAS-CHROMATOGRAPHIC DETERMINATION OF MONOSODIUM GLUTAMATE  
IN FOOD PRODUCTS

Gál, S., and P. Schilling (Mitteilung ans der Forschungsabteilung der Firma Haco AG, Gümlingen, Switzerland)  
Zeitschrift für Lebensmittel-Untersuchung und-Forschung 148, No. 1, 18-22 (Jan. 1972) (In German)

This paper describes a method for determining monosodium glutamate in food-stuffs by means of gas chromatography. The method involves extraction of the glutamate in water, purifying it on an ion-exchange column, then determining it as the N-trifluoroacetic-n-butylester derivative of the L-glutamic acid.

[2 figures, 3 tables, 9 references]

FTP

FTP

The authors developed a colorimetric method for determining trace nitrates in solutions containing up to 50 g. l<sup>-1</sup> of sodium chloride.

[3 figures, 1 table, 35 references]

Petriconi, Gianna L., and Henry M. Pappe (Center for Aerosol Nucleation, National Resource Council of Italy, Via Vettore 4 (Monte Sacro), 00141 Rome, Italy)

Water, Air, and Soil Pollution 1, No. 1, 42-49 (Nov. 1971)

7.9 ON ROUTINE COLORIMETRIC DETERMINATION OF TRACE NITRATES,  
(9.19) BY BRUCINE, IN THE PRESENCE OF CHLORIDE

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 13

8.42 TENEUR EN MERCURE DANS QUELQUES POISSONS DE CONSOMMATION COURANTE  
[CONTENT OF MERCURY IN SOME FISHES GENERALLY CONSUMED]

Thibaud, Yves  
Science et Pêche, No. 209, 1-10 (Dec. 1971) (In French) (Bulletin D'Information et de Documentation de L'Institut Scientifique et Technique des Pêches Maritimes, La Noë, Route de la Jonelière- 44 Nantes, France)

Data are given on the mercury content of fresh and frozen fish and of canned tuna. [3 figures, 3 tables, 1 reference]

DLJ

Reprinted

Samples of canned claw meat and other white meat, raw crabmeat, claw meat, other white meat, dark body meat, mixed meats, and the edible portion of whole male and female crabs found in North and South Devon were analysed for cadmium content. Cadmium was generally shown to be present in the dark body meat but not in the claw or other white meat. Levels of up to 9.7 p.p.m. were shown in samples of the edible portions of male crabs. Samples of dressed raw and canned crabmeat and crab pastes and spreads were also examined. One sample of raw dressed crabmeat contained 10.0 p.p.m. of cadmium. Generally samples contained between 1 and 8 p.p.m. cadmium. D.M.L.

8.42 CADMIUM IN CRABS AND CRABMEAT

Reynolds, C. V., and E. B. Reynolds  
J. Ass. publ. Analysts 2, No. 4, 112-115 (1971)  
BfMRA Abstracts 25, No. 3, Abstract No. 825, 168 (Mar. 1972)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 13

THE PRECISION OF MEASURING METABOLIZABLE ENERGY  
IN POULTRY FEEDSTUFFS

(6.19) 7.6

Potter, L. M. (Department of Poultry Science, Virginia Polytechnic Institute and State University, Blacksburg, VA 24060)  
Feedstuffs 44, No. 13, 28-29, 40 (Mar. 27, 1972)

This paper considers the precision in measuring the metabolizable energy values of feedstuffs in poultry rations. The author discusses the determination of and calculations for the metabolizable energy of a diet; the calculations for metabolizable energy of a feed ingredient; the analytical variation in metabolizable energy determination; the variation in metabolizable energy values of a diet attributable to laboratory analyses; the experimental variation found in metabolizable energy determination of diets; and the effect of level of ingredient substitution on the variation in the metabolizable energy determination of the ingredient.

The author believes that metabolizable energy values of diets and feed ingredients have been and can continue to be evaluated with considerable accuracy and precision through proper design and replication of experiments. Data on metabolizable energy values are valuable for efficient application of feed ingredients in commercial poultry rations.

[1 figure, 8 tables, 7 references]

DLF

Greve, P. A., and S. L. Wit (Rijksinst. Volksgezond., Bilthoven, Netherlands)  
Chemical Abstracts 76, No. 1, 2622x (Jan. 3, 1972)

8.42 (9.19)

MERCURY IN FISH. II. TOTAL MERCURY CONTENT  
IN FRESHWATER AND MARINE FISHES

STATISTICAL TERMS

8.7

Anonymous

Food Manufacture 9, 2, No. 7, 27 (Feb. 21, 1972)

The British Standards Institution has prepared a draft for comment of their Glossary of Terms Relating to Sensory Analysis. Copies are available from the Institution at 2 Park Square, London, W1P 8BS, England. The reference number is 42255/17.

DLF

Mathematical formulae are used to correlate values for the stimulating effect of various light intensities and concentrations on odour and flavour components with the relevant degrees of sensitivity. The validity of these equations is proved. C.S.B.  
Reprinted

Herrmann, J.

Nahrung 15, No. 8, 837-857 (1971) (In German; English summary)  
BEMIRA Abstracts 25, No. 3, Abstract No. 1043, 209 (Mar. 1972)

NEW METHODS FOR THE EVALUATION AND INTERPRETATION  
OF SENSORY QUALITIES OF FOODSTUFFS AND FOR THE FORECASTING  
OF THEIR CHANCES. III. ON PROBLEMS CONCERNED WITH SCALES  
FOR GRADING

7.8

A METHOD FOR EXAMINATION OF THE DISTRIBUTION  
OF CITRATE IN BALTIC HERRING FILLETS KEPT IN SALINE SOLUTION

565.7

Kuusi, T., and R. Kytöakangas  
Lebensm.-Wiss. & Technol. 4, No. 1, 1-6 (1971) (In English)  
BEMIRA Abstracts 24, No. 6, Abstract No. 1700, 356 (June 1971)

Citrate is added to fish to protect the proteins when frozen or salted. The fillets were allowed to stand in saline solution containing citrate for up to 5 days and the diffusion of citrate throughout the fillets was followed by the use of <sup>14</sup>C citrate. The citrate was distributed quite widely after 5 days with localization at the muscle surface. It was suggested that this had a bearing on the protective effect of citrate (prevention of a decrease in the water-binding capacity). C.S.B.  
Reprinted

Durand, Henri  
Science et Pêche, No. 209, 11-13 (Dec. 1971) (In French)  
[1 figure, 1 table, 4 references]

7.53

DOSAGE RAPIDE DES MATIÈRES GRASSES DU POISSON  
[RAPID DETERMINATION OF FATTY MATERIAL IN FISH]

PROCEDURE FOR THE MEASUREMENT OF FATS IN FOODS

55.7

Southgate, V. A. D. (Dunn Nutritional Laboratory, University of Cambridge and Medical Research Council, Milton Road, Cambridge, England)  
The Science of Food and Agriculture 22, No. 11, 165-166 (Nov. 1971)

The author developed a rapid and reproducible procedure for the determination of fat in foodstuffs based on extraction of the foodstuffs with a mixture of methanol. [51 table, 1 figure, 5 references]

DLF

The new rapid method presented involves heating samples of ground raw or cooked samples of meat or meat products in an alkaline solution which allows separation of the fat portion. The fat is measured in graduated volumetric bottles. Results using this method were compared with those obtained on the same products by the Goldfisch ether method and Salwin's modified Babcock method. S.M.S.  
Reprinted

A NEW RAPID METHOD FOR MEASURING THE FAT CONTENT  
IN MEAT AND MEAT PRODUCTS

7.53

Moreau, J. R., and J. Galhidi

Can. Inst. Food Technol. 4, No. 4, 154-158 (1971)  
BEMIRA Abstracts 25, No. 3, Abstract No. 684, 140 (Mar. 1972)



8.50 CAROTENOIDS IN FISH. I. CAROTENOIDS IN THE EGGS OF ACIPENSER RUTHENUS L. (ACIPENSERIIDAE) FROM THE DANUBE

Czeczuga, B. (Department of Biology, Bialystok Medical Academy, Bialystok, Poland) *Hydrobiologia* 39, No. 1, 9-16 (Jan. 31, 1972)

Fish assimilate carotenoids with their food and these carotenoids are then deposited in various organs in an oxygenized form. Often the carotenoids are accumulated in large amounts in the external parts of the fish giving them a different coloration. No data on the presence of carotenoids in Acipenseridae appear in the literature; therefore, the author carried out a study to provide this information. Unfertilized eggs of the *A. ruthenus* L. were used in the test. They were obtained from six specimens caught in the Danube River near Galati, Rumania, in April 1970. For comparison purposes, analysis was also carried out on the eggs of the Acipenseridae from the waters of the Soviet Union--these eggs are known as "caviar." Column and thin-layer chromatography methods were used to identify the carotenoids.

8-Carotene, astaxanthin ester, tunaxanthin, lutein, and zeaxanthin were found in the eggs of the *A. ruthenus* L. Isozeaxanthin, astaxanthin ester, lutein, zeaxanthin, taraxanthin, and astaxanthin were found in the "caviar." [2 figures, 1 table, 28 references] FTP

1.6 MAN AND THE BIOSPHERE: AN INTERNATIONAL RESEARCH PROGRAMME

Batisse, Michel (Division of Natural Resources Research, UNESCO, Place du Fontenoy, Paris 7<sup>e</sup>, France) *Biological Conservation* 4, No. 1, 1-6 (Oct. 1971)

The new international research program entitled Man and the Biosphere launched by the General Conference of UNESCO is described in this article. The program focuses on (1) the structure and functioning of the biosphere and its ecological regions, (2) the changes brought about by man on the biosphere and its resources, (3) the effects of these changes upon the human species, and (4) the education and information that must be provided on these matters.

[4 references] FTP  
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[3 figures, 2 tables, 12 references]

9.10 THE MODELING OF THE INTERACTION BETWEEN A FISHERY AND THE ECOLOGICAL SYSTEM OF A BODY OF WATER

Menshukhin, V. V. (Institute of Evolutionary Physiology and Biochemistry, U.S.S.R., Academy of Sciences)

*Journal of Ichthyology* [Voprosy Ikhtologii] 11, No. 2, 158-163 (1971)

In this study, the author shows that it is possible to treat the entire ecological system of a body of water involved in fish production as a single integral system which may be mathematically modeled on a computer. The method was applied to a specific body of water (Lake Dal'neye, Kamchatka) with promising results.

9.11 (8.4)

PROCESSING EASTROPAC STD DATA AND THE CONSTRUCTION OF VERTICAL TEMPERATURE AND SALINITY SECTIONS BY COMPUTER

Miller, Forrest R. (Inter-American Tropical Tuna Commission, La Jolla, CA 92037), and Kenneth A. Bliss (Southwest Fisheries Center, National Marine Fisheries Service, La Jolla, CA 92037)

NOAA Technical Report NMFS CIRC-365, 1v + 17 pp. (Feb. 1972) (National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Seattle, WA 98115) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price \$0.30.

During the EASTROPAC expeditions the STD (salinity-temperature-depth recorder) was established as the principal instrument for obtaining detailed profiles of temperature and salinity to depths exceeding 1,000 m. The STD system recorded data in digital form on magnetic tape and required computer processing to provide accurate temperatures and salinities at 1-m intervals for each hydrographic station.

Procedures for processing STD data from pre-processed digital logger tapes are described. Also included is a discussion of processing temperatures and salinities from the STD analog charts or from Nansen cast data when the digital data logger was not operative. Essential calibration of STD data from Nansen cast data is outlined. Finally, a computer program which prepares a final, annotated STD tape, with corrected temperatures and salinities, is described in great detail.

Another computer program was developed to provide for the EASTROPAC Atlas representative vertical sections of temperatures and salinities extracted from the final STD tapes. Details of computer methods employed to analyze and contour STD (over)

9.11 OCEANOGRAPHIC ATLAS OF THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Anonymous

Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (1971), 531 pp., Order No. S/N 3800-0104. Price \$30.00. Selected U.S. Government Publications 1, No. 6, Item 63F (1972)

The International Indian Ocean Expedition was an intensive study of the 28 million-square-mile Indian Ocean by scientists of 28 cooperating nations working from shore stations and an extensive fleet of research vessels. Major areas of interest were biological factors, including possible fishery resources; the formation of the ocean basin and the forces that have shaped and are continuing to shape it; the chemical and physical description of the waters of the Indian Ocean, and the study of their motions; and the interaction between the ocean and the atmosphere particularly with respect to the monsoon winds. This Atlas contains 449 colored maps and diagrams. It provides information on water temperature, depth, density, temperature gradient, and transport, as well as the salt, oxygen, phosphate, nitrate, and silicate content of the water. To provide users of this Atlas with the greatest amount of information about the relatively unknown Indian Ocean, and to help provide a picture of the Ocean as an entity, the volume includes almost all data collected in the Indian Ocean from the mid-1920's to 1966.

Reprinted



Sonstegard, R. A., and L. A. McDermott (Department of Microbiology, College of Biological Science, University of Guelph, Guelph, Ontario, Canada), Karen S. Sonstegard (Department of Biomedical Sciences, Ontario Veterinary College, University of Guelph)

Nature 236, No. 5343, 174-175 (Mar. 24, 1972)

This paper is the first report of the isolation of infectious pancreatic necrosis (IPN) virus from nonsalmonid fishes. IPN is an acute, highly contagious disease of salmonid fishes characterized by explosive outbreaks of mortalities in salmonid fry. Little is known concerning the occurrence and consequences of the disease in native fishes. Therefore, the authors conducted a survey to determine the presence of IPN virus in fishes in the tailwaters of two IPN-infected trout hatcheries.

The researchers found the visceral homogenate from the suckers to possess an IPN titre of  $10^{5.1}$  TCID<sub>50</sub>; however, this observation does not prove necessarily that these fish were actively infected with the virus. The virus detected may have been that ingested in infected food. White suckers (and perhaps other non-salmonid fishes) may play a role in the ecology and epizootology of infectious pancreatic necrosis. [1 table, 6 references]

DTF

Lange, Rolf (Inst. Mar. Biol., Univ. Oslo, Oslo, Norway)  
Chemical Abstracts 76, No. 8, 37142c (Feb. 21, 1972)

## MARINE BIOLOGY AND CHEMISTRY

9.12

9.11 (8.4)

These rules are issued by the IUPAC Commission on the Nomenclature of Organic Chemistry (CNOC) and the IUPAC-IUB Commission on Biochemical Nomenclature (CBN).

European Journal of Biochemistry 25, No. 3, 397-408 (Feb. 1972)

European J

FTP

After having made use of its thermal energy, cold, deep-sea water is a source of nutrients feeding a mariculture operation and producing a valuable crop of sea-food. The sea water finally released, having been stripped of its nutrients in the mariculture system, is then chemically and physically similar to the surface waters and will not affect the local ecology. (author text, mod. by RW) Reprinted

NOAA Publications Announcement No. 12-3, Item 12-05-18-01, 8 (Feb. 1972)

Roels, O. A. A., Van Hemelryck, R. D. Gerard, and J. L. Worzel (Lamont-Donerly Geological Observatory, Columbia University, Palisades, N.Y.)  
In Colloque International sur l'Exploitation des Océans, Bordeaux, France, Mar. 9-12, 1971. 22 pp. Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10086. \$0.64. 14 cm. 250 copies.

**COLD, NUTRIENT-RICH WATER: THE MOST ABUNDANT RESOURCE OF THE DEEP SEA**

9.11

# UPTAKE AND RELEASE OF FREE AMINO ACIDS BY STARFISHES

9.13

Biological Bulletin 141, No. 1, 122-129 (Aug. 1971)

Ferguson, John Carruthers (Department of Biology, Florida Presbyterian College, St. Petersburg, FL 33733)

Earlier work has indicated that many species of marine invertebrates are able to remove dissolved amino acids and other nutritional compounds directly from sea water, even when the materials are present in low concentrations. In the present study, the researchers measured the net uptake and release of dissolved free amino acids by 10 species of Puget Sound starfishes. Gas-liquid chromatography was used to measure the net uptake and release of amino acids by the starfish. The author indicates that the results of this study support the concept that starfish can receive net benefit from dissolved nutrients in their environments. Furthermore, the transport system for taking up amino acids is also significant in the retention of those amino acids already in the metabolic pools.

[4 tables, 21 references]

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[7 figures, 6 references: 1 appendix with 3 figures]

The STD provided many detailed profiles along cruise tracks in the eastern tropical Pacific with an accuracy approaching those taken by Nansen casts; but it created new problems in processing oceanographic data. The problems, their solutions and recommendations are presented for those who may benefit from many months



<p>9.13 (9.19)</p>	<p>SEASONAL VARIATIONS IN THE METABOLISM OF LIPIDS AND GLYCOGEN IN THE SCALLOP, <u>FATINOPECTEN YESSOENSIS</u> (Jay).</p> <p>Takahashi, Kanji, and Katsuyoshi Mori (Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan) Tohoku Journal of Agricultural Research <u>22</u>, No. 2, 114 ff. (Aug. 1971)</p> <p>I. <u>Biochemical Studies</u>. pp. 114-133.</p> <p>The purpose of this study was to examine biochemically the seasonal variations in the metabolism of lipids and glycogen in cultured scallops. The digestive diverticula of the scallop contained high levels of lipids; the adductor muscle contained high levels of glycogen. The seasonal variations in the level of lipids in the digestive diverticula and the level of glycogen in the adductor muscle were generally parallel to the variations of the same constituents in the entire soft body of the scallop. The authors suggest from these observations that the digestive diverticula in the scallop is the main organ for lipid metabolism and the adductor muscle is the main organ for glycogen metabolism.</p> <p>[8 figures, 4 plates containing 4 illustrations each, 11 references]</p> <p>II. <u>Histochemical studies</u>. pp. 134-145.</p> <p>The purpose of this work was to examine histochemically the seasonal variations in the metabolism of lipids and glycogen in cultured scallops. The lipids in the digestive diverticula appeared as numerous droplets in the epithelia of the tubules (they were also present in the epithelia of the ducts). The glycogen in (over)</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 6 PAGE 17</p>
<p>9.13 (9.19)</p>	<p>COMPARATIVE METABOLISM OF DDT, METHYLCHLOR, AND ETHOXYCHLOR IN MOUSE, INSECTS, AND IN A MODEL ECOSYSTEM</p> <p>Kapoor, Inder P., Robert L. Metcalf, Asha S. Hirwe, Po-Yung Lu, Joel R. Coats, and Robert F. Nystrom (Departments of Entomology and of Zoology, University of Illinois, Urbana, IL 61801) Journal of Agricultural and Food Chemistry <u>20</u>, No. 1, 1-6 (January-February 1972)</p> <p>This article reports information on the metabolism of DDT [1,1,1-trichloro-2,2-bis(4-chlorophenyl)-ethane], methylchlor [2,2-bis(4-methylphenyl)-1,1,1-trichloroethane], and ethoxychlor [2,2-bis(4-ethoxyphenyl)-1,1,1-trichloroethane]. The metabolic pathways of methylchlor and ethoxychlor in mice and insects and for biodegradability in a model ecosystem were examined.</p> <p>Ethoxychlor [like methoxychlor] is metabolized by O dealkylation to form 2-(4-hydroxyphenyl)-2-(4-ethoxyphenyl)-1,1,1-trichloroethane and subsequently to 2,2-bis(4-hydroxyphenyl)-1,1,1-trichloroethane. In the model ecosystem, ethoxychlor appeared in fish (top of the food chain) at 1,500 times the amount it appeared in water, together with larger amounts of polar and dealkylation products. Metabolization of methylchlor was by oxidation of its arylmethyl groups to form 2-(4-hydroxymethylphenyl)-2-(4-methylphenyl)-1,1,1-trichloroethane and by subsequent oxidation to 2,2-bis(4-carboxyphenyl)-1,1,1-trichloroethane. In the model ecosystem, fish contained 1,400 times the amount of methylchlor that was in the water, together with larger amounts of polar metabolites.</p> <p>Ethoxychlor and methylchlor (DDT analogs) are much more biodegradable than DDT is; DDT was concentrated in fish at 85,000 times the amount in water.</p> <p>[5 figures, 7 tables, 14 references]</p> <p>FTP</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 6 PAGE 17</p>

<p>9.13 (8.59)</p>	<p>THE CONTENT OF FAT-FREE DRY MATTER IN THE BODY OF SOME BLACK SEA FISHES</p> <p>Shul'man, G. Ye., and L. M. Kokoz (Institute of the Biology of the Southern Seas, Ukrainian Academy of Sciences, Sevastopol' and Azov-Black Sea Research Institute for Fisheries and Oceanography, Kerch, U.S.S.R.) Journal of Ichthyology <u>11</u>, No. 2, 268-272 (1971)</p> <p>The content of fat-free dry matter in the body of the anchovy, sprat, whiting, surmullet, bonnetmouth, large horse mackerel, and small horse mackerel is extremely stable and varies very little with age of the fish or with different periods of the annual cycle. Furthermore, no relation exists between the content of fat-free dry matter in the body of the fishes and aspects of their metabolism or mode of life. The results indicate that the protein content of the fish body is extremely stable, reflecting the maintenance of the relative mass of structural elements in the fishes at a level that is approximately constant for a given species.</p> <p>[8 figures, 3 tables, 25 references]</p> <p>FTP</p> <p>The fish-breeding pond is covered with a highly insulating floating surface to conserve heat.</p> <p>Official Gazette of the U.S. Patent Office <u>893</u>, No. 2, 504 (Dec. 14, 1971)</p> <p>U.S. Patent 3,626,901</p> <p>Englesson, Sixten (Djursholm, Sweden); assignor to Sternberg-Flygt AB, Solna, Sweden (pat.)</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 6 PAGE 17</p>
<p>9.13 (0.35)</p>	<p>PHOSPHOLIPIDS OF FISH GILLS</p> <p>Thomas, Andrew J., and Stuart Patton (Lipids Laboratory, The Pennsylvania State University, University Park, PA 16802) Lipids <u>7</u>, No. 1, 76-78 (Jan. 1972)</p> <p>Lipids were extracted from nine species of fish and the individual phospholipids as a percentage of the total were determined. The fish tested were coho salmon, pink salmon, kelp bass, sand bass, whitefish, sheephead, Pacific rat-tail, and flatnose codling. The pattern of composition of the phospholipids in the gill filaments of the fish did not appear to vary among the fish living at greatly differing ocean depths; also, the pattern did not appear to vary between pre- and postspawning salmon. [1 table, 11 references]</p> <p>FTP</p> <p>Artificial diets were used in feeding tests to examine protein utilization for growth by <u>Pemaneus monodon</u> Fabricius.</p> <p>[8 figures, 6 tables, 13 references]</p> <p>Lee, Dong-liang (Tungkang Marine Laboratory, Taiwan Fisheries Research Institute, Aquiculture 1, No. 4, 1-13 (Dec. 1971) (In Chinese; abstract, figures, and tables in English)</p> <p>STUDIES ON THE PROTEIN UTILIZATION RELATED TO GROWTH IN <u>Pemaneus monodon</u> Fabricius</p>	<p>COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 6 PAGE 17</p>

9.13 FATTY ACID ALTERATIONS DURING MIGRATION AND EARLY SEA WATER GROWTH OF CHUM SALMON (ONCORHYNCHUS KETA)

Saddler, J. B., K. V. Koski, and R. D. Cardwell (Fisheries Research Institute, University of Washington, Seattle, WA 98195)  
Lipids 7, No. 2, 90-95 (Feb. 1972)

This study was conducted in May and June of 1968. The purpose was to examine the fatty acid characteristics and lipid contents of chum salmon fry during their early development in fresh water, seaward migration, and early sea-water growth. Some data on lipid contents are shown in the table that follows.

Group of fry	Fork length (mean)	Body weight (mean)	Lipid content
FW	mm.	g.	%
FW	37	0.31	2.5
SW	38	0.44	2.4
FW-SW	38	0.29	2.0
FW	44	0.54	1.7
SW	45	0.84	2.0
FW-SW	45	0.47	1.4
FW-SW	52	1.40	1.7
FW-SW	55	0.99	1.4

residing in fresh water; SW - after migration into sea water; FW-SW - following artificial introduction into sea water.

The adductor muscle was localized in the cells of the connective tissue. The level of lipids (mostly neutral fats) in the epithelia of the tubes of the digestive diverticula was high in the summer, but decreased markedly when the scallops began the development of sexual maturity. However, the total amount of lipids increased rapidly during sexual maturation. Also, the glycogen content of the adductor muscle increased during the process of sexual maturation of the scallop.

[4 tables, 29 references] FTP

9.16 REHABILITATION OF NATURAL OYSTER SEED GROUNDS DESTROYED OR DAMAGED BY HURRICANE CAMILLE

Tarver, Johnnie  
Completion Report, Project 2-101-D, 8 pp. (Jan. 1971) Louisiana Wild Life and Fisheries Commission, New Orleans, La. Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10059.  
NOAA Publications Announcement No. 72-5, Item 72-05-16-15, 7 (Feb. 1972)

Large Rangia clam shell 3/4 in. in diameter or larger dredged in Lake Maurepas was planted in October and November of 1969 to provide oyster cultch for use in September 1971 and in subsequent years. Clam shells were washed overboard using six high-pressure water hoses powered by two diesel pumps with about 90 psi pressure on a 1.25 in. nozzle. A total of 1,218 superficial acres were planted with 30,083 cubic yards of clam shell in 35 days at a cost of \$119,430.90. Periodically, clam shells were dredged and oyster spat were counted, measured, and recorded. Oyster spat catch at the Black Bay site was 22 percent; whereas, the catch was 10 percent at Three Mile Pass. Initial examinations of the shell indicate that this shell planting effort was successful. (Author abstract, mod. by SK)

Reprinted

9.11 A STUDY OF THE DIGESTIBILITY OF ARTIFICIAL FOODS BY POND FISHES. COMMUNICATION IV. DIGESTIBILITY OF THE NUTRIENTS OF SUNFLOWER OIL-SEED MEAL, LUPIN, RYE AND FOOD MIXTURE BY YEARLING CARP

Shcherbina, M. A., and O. P. Kazlauskene (All-Union Pond Fisheries Research Institute, Rybnoye Postal District, Moscow Province, U.S.S.R.)  
Journal of Ichthyology 11, No. 2, 253-257 (1971)

This paper reports on feeding tests carried out in 1968 on yearling carp reared in ponds. The test was conducted for 70 days. The components of the carp diets tested consisted of sunflower oil-seed meal, lupin, rye, and a food mixture consisting of 40% sunflower oil-seed meal, 10% linseed cake, 12% lupin, 26% rye, 5% fishmeal, 4% hydrolysate yeast, and 3% grass meal. Apparently, the digestibility of the sum total of all the nutrients of the foods tested ranged from 40% to 52%. The diet supplied insufficient energy (the lipid content was low and the digestibilities were low). As a result the carp had to utilize the protein of the diet for energy metabolism. More attention must be placed on the energy content of the diets for carp.

[5 tables, 6 references] FTP

9.16 AQUACULTURALLY GROWN PAN-SIZE SALMON COULD SOLVE FISH SCARCITY PROBLEM

Katz, Arnie  
Quick Frozen Foods 34, No. 8, 81-83, 109 (Mar. 1972)

Salmon are being reared to 1/2-lb. size in Puget Sound using floating-net pens. The first harvest is expected to total 200,000 lb. of fish. [3 illustrations] FTP

9.13 ACCUMULATION OF FREE FATTY ACIDS FROM SEA WATER BY MARINE INVERTEBRATES

Testerman, John K. (Department of Development and Cell Biology, University of California, Irvine CA 92664)  
Biological Bulletin 142, No. 1, 160-177 (Feb. 1972)

The researchers established that representative marine annelids can accumulate and metabolize dissolved free fatty acids. They confirmed the uptake of free fatty acid from dilute solution by the polychaete *Stauroneis indolophilus*. Apparently, the levels of free fatty acids found in the natural environment are probably too low for uptake to support more than a few percent of the organism's metabolism. [5 figures, 5 tables, 32 references] FTP



STUDIES ON THE USE OF VERTICAL SUBSTRATES FOR IMPROVING PRODUCTION OF PINK SHRIMP, PENAEUS DUORARUM BURKENROAD

Rickards, William L. (University of Miami, Sea Grant Program (Living Resources), Miami, Fla.)

Sea Grant Technical Bulletin No. 10, 152 pp. (Jan. 1971) Sales copies available from the National Technical Information Service, Sills Bldg., Springfield, VA 22151; Order No. COM-71-01064.

NOAA Publications Announcement No. 72-1, (72-01-16-20), 8 (Jan. 1972)

Three experiments were conducted to determine the manner in which pink shrimp react to one artificial condition: the presence of manmade, vertical surfaces upon which the shrimp are intended to move and feed. The results of the studies show that it is possible to realize significantly greater yields from shrimp grown in tanks in which an assemblage of fouling organisms is available as food than from shrimp with no fouling food source, even though all shrimp are given some supplemental protein. Although a certain amount of fouling will grow on the bottoms of shrimp ponds without encouragement by the culturist, in many instances the algae will be mainly blue-green species. (Author)

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## ENVIRONMENT CONFERENCE DOCUMENTS TO BE PUBLISHED FOR PUBLIC SALE

Anonymous

Department of State Bulletin 66, No. 1709, 494 (Mar. 27, 1972)

The Department of State has arranged for publication of the documentation prepared by the Secretariat of the United Nations Conference on the Human Environment for consideration by the nations attending the meeting which is to be held in Stockholm, Sweden, June 5-16. The documents total 632 pages and will be reproduced by the National Technical Information Service (NTIS) of the Department of Commerce. A complete set may be purchased for \$12 or three parts individually. The part numbers, the number of pages of each section, and the NTIS order number, together with the price, are listed below.

Part I includes Agenda (4 pp.), Annotated Agenda (12), Rules of Procedure (14), Declaration (12), Action Proposals (60). (Order no. PB 206618-1; \$3.)

Part II includes Planning & Management of Human Settlements for Environmental Quality (40), Environmental Aspects of Natural Resources Management (100), Identification & Control of Pollutants & Nuisances of Broad International Significance (100), Educational, Informational, Social & Cultural Aspects of Environmental Issues (40), Development & Environment (70), International Organizational Implications of Action Proposals (50). (Order no. PB 206618-2; \$6.)

Part III includes Administration Coordinating Committee Report (80), Bibliography (50). (Order no. 206618-3; \$3.)

Complete set of above. (Order no. 206618-SET; \$12.)

(over)

## MERCURY CONCENTRATIONS IN MUSEUM SPECIMENS OF TUNA AND SWORDFISH

Miller, G. E., P. M. Grant, R. Kishore, F. J. Steinkruger, F. S. Rowland, and V. P. Guinn (Department of Chemistry, University of California, Irvine, CA 92664)

Science 175, No. 4026, 1121-1122 (Mar. 10, 1972)

Have manmade sources of mercury pollution of the oceans significantly increased the mercury levels in wide-ranging ocean fish? To help answer this question the present researchers determined by instrumental neutron activation analysis the mercury levels of museum specimens of 7 tunas caught 62 to 93 years ago and a swordfish caught 25 years ago. Data on the mercury levels of the museum specimens were compared with that of specimens caught recently.

The mean mercury concentration of the seven museum specimens of tuna was  $0.95 \pm 0.33$  p.p.m. (the values ranged from 0.53 to 1.51 p.p.m.) (dry-weight basis). The mean mercury content of the five recent samples of tuna was  $0.91 \pm 0.47$  p.p.m. (the values range from 0.44 to 1.53 p.p.m.). The authors conclude that there was no significant difference in mercury concentration between the museum samples of tuna (caught 62 to 93 years ago) and the samples of recently caught tuna. Furthermore, they indicate that the data for tuna and swordfish support the contention that the mercury levels now being found in wide-ranging ocean fish are not primarily the result of manmade pollution but are of natural origin.

[1 table, 5 references]

FTP

## RELEASE OF MERCURY FROM CONTAMINATED FRESHWATER SEDIMENTS BY THE RUNOFF OF ROAD DEICING SALT

Feick, G., R. A. Horne, and D. Yeaple (JBF Scientific Corporation, 2 Ray Avenue, Burlington, MA 01803)

Science 175, No. 2046, 1142-1143 (Mar. 10, 1972)

The mercury content in stream sediments varies widely with the type of sediment [Y. G. Bayev, Dokl. Akad. Nauk SSSR 181, 211 (1968)]. It is known that chloride ion complexes strongly with mercury, and sodium and calcium ions can compete with  $Hg^{2+}$  for exchange sites. The authors found that the addition of NaCl or  $CaCl_2$  increased the relative amount of mercury in water in equilibrium with sediments (sandy, or highly organic) by two to five or more orders of magnitude. The possibility is raised, therefore, that road salt (in addition to being a serious contaminant itself) could release mercury from bottom sediments of natural water courses. This information, too, is of interest relative to the chemistry of heavy metals in the estuarine environment where sediment-laden fresh water and salt water are mixed. [1 table, 4 references]

FTP

Aranson, Arthur L. (New York State Vet. Coll., Cornell Univ., Ithaca, N.Y.)  
Chemical Abstracts 76, No. 1, 634d (Jan. 3, 1972)

## BIOLOGIC EFFECTS OF LEAD IN FISH

61.6

Dinstein, Yoram University, Tel Aviv, Israel) (Jan. 1972)  
Journal of Maritime Law and Commerce 3, No. 2, 363-374

This article is a discussion of the various methods that have been evolved of coping with the problem of oil pollution of the high seas and the distinction not only between legal techniques but also between legal concepts. The author concludes that the legal solution that could best reconcile the need for controlling pollution and the freedom of the high seas would necessitate a new international convention. He lists five main points upon which such a convention should be based.

Results of experiments using column chromatography showed that chitosan and Dowex A 1 (Chelex) are effective in collecting Hg, even though the metalorganic compounds are not fixed so strongly as the simple ions. The authors suggest that these chelating polymers might be applied in the treatment of those waters where monomethyl mercury and mercury ions are present.

Mazzarelli, Riccardo A. A., and Antonio Isolati (G. Ciamician, Chemical Institute, University of Bologna, Via Selmi 2, Bologna 40126, Italy)  
Water, Soil, and Air Pollution 1, No. 1, 65-71 (Nov. 1971)

METHYL MERCURY ACETATE REMOVAL FROM WATERS BY CHROMATOGRAPHY ON CHELATING POLYMERS

LEGEL ABATEMENT (6.6) 61.6

Levi, Donald R. (University of Missouri, Columbia, MO 65201), and Dale Colyer (Division of Resource Management, West Virginia University, Morgantown, WV 26506) (Mar. 1972)  
Science 175, No. 4026, 267-275

The author believes that citizen-initiated legal approaches may help to protect and improve the environment (for the sake of discussion the authors accept that an ecological crisis exists). Such an approach may have two important results: (1) actual or potential cases of pollution may be halted, reduced, or prevented and the problems and insecurities following a substantial body of litigation may lead to the more comprehensive and rational planning and development that is required for solutions to the ecological crisis.

This work demonstrates that species diversity (phytoplankton, zooplankton, nekton, and benthos samples) levels in Galveston Bay, Texas, are related to the percentage of unpolluted water at any given station in upper and lower Galveston Bay. [5 figures, 6 tables, 19 references]

SPECIES DIVERSITY AND WATER QUALITY IN GALVESTON BAY, TEXAS

Copeland, B. J., and Timothy J. Bechtel (Department of Zoology, North Carolina University, Raleigh, NC 27607, U.S.A.)  
Water, Air, and Soil Pollution 1, No. 1, 89-105 (Nov. 1971) (D. Reidel Publishing Co., Dordrecht, Netherlands)

The action proposals included in part I are a summary of the issues and include as an appendix all recommendations for national and international action. Thus part I should meet the requirements of most of the public interested in the Stockholm meeting. Orders should be addressed to the National Technical Information Service, Department of Commerce, Springfield, VA, 22151, accompanied by check or money order made payable to NTIS. It is essential that the NTIS document number be indicated on the order for prompt service.

The purpose of this study was to determine whether phosphate alone or a mixed fertilizer of N-P-K is more effective in increasing plankton and fish production. The phosphate fertilizer alone proved to be more effective in the production of fish than did the mixed fertilizer. The mean fish production was as follows: for control ponds, 382 kg/ha; for the phosphate fertilizer-treated ponds, 824 kg/ha; and for the N-P-K fertilizer-treated ponds, 581 kg/ha.

Ono, Hong-Siong (Freshwater Fisheries Laboratory, Sembawang Field-Experimental Station, 10 1/2 M.S. Sembawang Road, Singapore 26)  
Aquaculture 1, No. 4, 14-22 (Dec. 1971) (In Chinese; abstract, figures, and tables in English)

FERTILIZER EXPERIMENTS IN CHUPEI FRESHWATER PONDS-I. THE EFFECT OF PHOSPHORUS FERTILIZER AND MIXED N-P-K ON PLANKTON AND FISH PRODUCTION

STATES IN THE UNITED PROGRESS IN POMPANO MARICULTURE (61.1) 61.6

Finucane, John H. (NOAA, National Marine Fisheries Service, Biological Laboratory, St. Petersburg Beach, Fla.)  
In World Mariculture Society, First Annual Workshop, Louisiana State University, Baton Rouge, La., Feb. 9-10, 1970. Proceedings, Baton Rouge, La., pp. 66-72 (1971)  
NOAA Publications Announcement No. 171-02-71-02-16-13-13 (Dec. 1971)

Pompano (Trachinotus carolinus) mariculture has accelerated in Florida and other areas along the Gulf Coast. Research by numerous governmental, academic, and commercial organizations should ensure success in the future. Present regulatory laws in Florida now require leasing of bay bottoms for mariculture purposes and limit the stocking of any commercial numbers of wild pompano. Pompano are hardy, fast-growing fish, and command a high price. Experimental results show that it is possible to produce a market-size fish in about 6 months. With a balanced diet, temperature control, and good water quality, production exceeded 1000 kg per ha per year. Because of their prolific reproduction, a few adult fish would be needed to provide control of the hatchery. Although the hatchery process has been successful, the problems of distribution and marketing are still unsolved. The author is planning to develop a commercial hatchery and marketing program.

Reprinted from the author.



Bonderman, Dean Paul, and Edwin Slach (Department of Clinical Pathology, Indiana University Medical Center, Indianapolis, IN 46202)  
Journal of Agricultural and Food Chemistry 20, No. 2, 328-331 (Mar.-Apr. 1972)

Heptachlor was one of the earliest and most important organochlorine insecticides to have widespread use on agricultural lands. It has a wide variety of metabolic end products, e.g. heptachlor epoxide, chlordene, chlordene epoxide, 1-hydroxychlordene, and 1-hydroxy-2,3-epoxychlordene are products of microorganism degradation of heptachlor [J. R. W. Miles, C. M. Tu, C. R. Harris, J. Econ. Entomol. 62, No. 6, 1334 (1969)].  $\gamma$ -Chlordene is the principle impurity in the stored material [M. C. Bowman, H. C. Young, and W. F. Bartel, J. Econ. Entomol. 58, No. 5, 896 (1965)]. The monitoring of heptachlor and its epoxide in the environment or in humans may not, therefore, give an adequate indication of its ultimate impact. Orderly analyses, using appropriate detection and conformational techniques, should be done on each particular metabolite to establish a library of information upon which rational judgments can be made about their effect on human health and the environment. This article is a report of the orderly study of the metabolite 1-hydroxychlordene. It includes an estimation of the pesticide use by the farm (where the metabolite of heptachlor occurred) and the analyses of environmental samples taken from the same geographical area. Fifteen hundred soils, 400 crops, and 75 fish samples were examined; 12 soils, 12 crops, and 13 fish samples were positive for 1-hydroxychlordene. The authors indicated that the finding of 1-hydroxychlordene in fish taken from the river and lakes fed by the runoff from (over)

Hannan, Patrick J., and Constance Patouillet (U.S. Naval Research Laboratory, Washington, DC 20390)  
Biotechnology and Bioengineering 14, No. 1, 93-101 (Jan. 1972)

This paper reports on the effects of various concentrations of mercury and other pollutants (silver, cadmium, lead, and copper) on the growth rates of various algae under controlled conditions in the laboratory. The tests were conducted on one fresh-water alga (*Chlorella pyrenoidosa*) and three marine algae (*Phaeodactylum tricornutum*, *Cyclotella nana*, and *Chaetoceros galvestonensis*). Mercury was more toxic than the other metals tested and its toxicity is comparatively irreversible. Also, the toxicity of mercury varied inversely with the level of nutrients present. Results of preliminary tests indicate that mercury in the form of mercuric chloride is more toxic than as methylmercury. The authors have yet to determine the amount of mercury that the algae can absorb and still grow. The subsequent phase of this study will include measurements of growth, oxygen production, and mercury uptake of algae.

FTP

[3 figures, 1 table, 12 references]

Matson, Robert S., George E. Mustoe, and S. B. Chang (Department of Chemistry and College of Environmental Science, Western Washington State College, Bellingham, WA 98225)  
Environmental Science & Technology 6, No. 2, 158-160 (February 1972)

The purpose of this study was to determine the biological effect of mercury compounds on unicellular algae (one of the important members in the aquatic food chain). This paper reports on the in vivo effect of mercuric chloride and methylmercuric chloride on fresh-water algae, *Ankistrodesmus braunii* and *Euglena gracilis* under laboratory conditions, and on the effects of these mercury compounds on an enzyme, galactosyl transferase (responsible for the biosynthesis of galactolipids, one of the major chloroplast lipids).

Mercuric chloride and methylmercuric chloride strongly inhibit the synthesis of galactolipids and chlorophylls in whole cells of the unicellular algae under photosynthetic conditions. These mercury compounds also strongly inhibit the galactosyl transferase activity for the galactolipid biosynthesis in the chloroplasts isolated from *Euglena* cells and spinach leaves. Thus, the authors suggest, a similar detrimental effect could be expected with other photosynthetic organisms including phytoplanktons and other species of unicellular algae.

FTP

[2 figures, 2 tables, 12 references]

Post, Thomas R.

Sea Grant Technical Bulletin No. 22, University of Miami Sea Grant Program (Ocean Law) NOAA Sea Grant No. 2-35147, Coral Gables, Fla. (1971), vi + 72 pp. Price \$3.00. Available from Information Services, Sea Grant Institutional Program, University of Miami, 10 Rickenbacker Causeway, Miami, FL 33149.

In this study, the author examined matters relative to compensation to private persons for damage sustained by the discharge of oil from vessels on the navigable waters of the United States.

[206 footnotes, 1 table, bibliography of 73 references to articles, books, cases, treaties, and other documents]

FTP

The book is divided into three general subject areas: population and resources; environmental degradation; and environment and society.

Transactions of the American Fisheries Society 101, No. 1, 137-138 (January 1972)

D. W. Chapman (reviewer)

Price \$5.95

Murdoch, William W. (editor), Sinauer Assoc., Stamford, Conn. (1971), vii + 440 pp.

(9.17)(9.2)

ENVIRONMENT, RESOURCES, POLLUTION AND SOCIETY

<p>9.19 (0.5) THERMAL EFFECTS ON THE CONNECTICUT RIVER: BACTERIOLOGY</p> <p>Buck, John D., and Julia S. Rankin (Marine Research Laboratory, University of Connecticut, Noank, CT 06340) Journal of the Water Pollution Control Federation 44, No. 1, 47-64 (Jan. 1972)</p> <p>The objective of this study was to develop information relating to the effects of discharges from an atomic power plant on the aquatic environment to permit a rational evaluation of the disposal process. The aquatic environment near the site of an atomic power plant on the Connecticut River was selected as the site of this test. Before the power plant began operations, the researchers obtained data on the baseline populations of bacteria, phytoplankton, and chemical conditions of the particular area of the river; these data were used to compare with similar observations that were made after the plant began the generation of power. The study period extended from October 1965 to September 1969; it included 27 months before the plant began operations and 12 months after operations were initiated. Counts of mesophilic and psychrophilic bacteria in the water were made. Also, the following types of bacteria were enumerated: proteolytic, lipolytic, acid anaerobes, and streptococci. The researchers found no significant differences in the populations of bacteria studied. However, they consider the observational period following plant operation to be short. They also note that there were no drastic changes in the overall microbial ecology of the river in addition to the results of the study.</p> <p>[3 tables, 46 references]</p> <p>FTP</p>	<p>9.19 (9.3) OCEAN POLLUTION AND THE 1972 UNITED NATIONS CONFERENCE ON THE ENVIRONMENT</p> <p>Mendelsohn, Allan I. (Glassie, Pewett, Beebe &amp; Shanks, Washington, D.C.) Journal of Maritime Law and Commerce 3, No. 2, 385-398 (Jan. 1972)</p> <p>The United Nations Conference on Human Environment is scheduled to meet in Stockholm, Sweden, in June 1972. At a meeting of the Intergovernmental Working Group on Marine Pollution (London, June 14-18, 1971), the United States Government tabled a draft convention on ocean dumping for consideration and comment by all interested nations. Following the meeting, the U.S. Government, through the Secretary of State's Advisory Committee on the Stockholm Conference, held various public conferences in the United States to solicit public views on the conference and draft treaty. The present article reports the author's views as expressed before the Advisory Committee on July 27, 1971. The author believes that the draft treaty is inadequate substantially as well as strategically.</p> <p>FTP</p>
<p>9.19 (0.8) ANALYSIS OF DECOMPOSITION PRODUCTS OF PESTICIDES</p> <p>Kennedy, Maurice V., Boris J. Stojanovic, and Fred L. Shuman, Jr. (Mississippi State University, State College, MI 39762) Journal of Agricultural and Food Chemistry 20, No. 2, 341-343 (Mar.-Apr. 1972)</p> <p>One of the major problems of today is the disposal of waste pesticides and pesticides containers without contaminating the environment. This paper reports the results of analyses to identify the products formed from the thermal or chemical decomposition of 20 selected pesticides.</p> <p>The thermal decomposition products were carbon dioxide, carbon monoxide, nitrogen oxides, hydrochloric acid, and residues of inorganic compounds. The decomposition products formed when the pesticides were exposed to chemicals varied with the chemical used.</p> <p>[3 tables, 6 references]</p> <p>FTP</p>	<p>9.19 (9.3) PESTICIDES AND THE ENVIRONMENT</p> <p>Anonymous Administrative Law Review 24, No. 1, 121-135 (Winter 1972)</p> <p>This report directs itself to consideration of the federal regulations surrounding pesticides, those agencies that play a part in that regulation, the administrative procedures involved, and the means of administrative and judicial review under regulatory system.</p> <p>[102 footnotes; the Selected Bibliography lists 7 books, 9 Federal Regulations, 14 reports, 15 articles]</p> <p>FTP</p>
<p>9.19 (61.6) ETHYL MERCURY D-TOLUENE SULFONANILIDE: LETHAL AND REPRODUCTIVE EFFECTS ON PHEASANTS</p> <p>Spann, J. J., W. J. Heath, J. F. Kreitzer, and L. N. Locke (Patuxent Wildlife Research Center, Bureau of Sports Fisheries and Wildlife, U.S. Department of the Interior, Laurel, MD 21002) Science 171, No. 4007, 161-163 (January 21, 1971)</p> <p>Ethyl mercury d-toluene sulfonamide (the active ingredient of the commercial "m.p.d. 512") was found to be lethal to adult ring-necked pheasants. Also, the authors found that egg production when breeders were maintained on no dietary concentration of 30 m.p.d. 512 was reduced. The authors found that egg production was reduced when breeders were maintained on no dietary concentration of 30 m.p.d. 512.</p> <p>[2 tables, 10 references]</p> <p>FTP</p>	<p>9.19 (8.42) MERCURY IN WATER. A BIBLIOGRAPHY</p> <p>Anonymous Water Resources Scientific Information Center, Office of Water Resources Research, U.S. Department of the Interior, Washington, D.C. (Jan. 1972), 294 pp. Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. WRSIC72-207. Price \$3.00, paper copy; \$0.95 in microfiche.</p>



9.19  
(9.17)(9.2)

THE EFFECTS OF WATER- AND LAND-USE DEVELOPMENT ON THE AQUATIC  
ENVIRONMENT AND ITS RESOURCES AND SOLUTIONS TO SOME OF THE  
GENERATED PROBLEMS

Dill, William A., and D. W. Kelly (FAO Department of Fisheries), and J. C. Fraser  
(Environment Protection Authority, Victoria, Australia)  
FAO Fisheries Circular No. 129, FIRI/C129, 7 pp. (August 1971) (Distribution re-  
stricted) (Food and Agriculture Organization of the United Nations, Via  
delle Terme di Caracalla, Rome, Italy)

Because water resource and land development projects modify hydrological  
cycles and existing patterns of water and land use, they may have negative effects  
on the aquatic environment and the living resources. Some of these negative ef-  
fects may be offset, entirely or in part, if (1) a review of the possible problems  
is made early in the planning stage of the project, (2) the problems are recog-  
nized, (3) the problems are investigated in the field, (4) the recommendations are  
prepared and submitted before completion of the project plans, and (5) the recom-  
mendations are implemented concurrently and in a timely manner relative to devel-  
opment of the water resource and land development project. Furthermore, there  
should be post-project review to assess the application and value of the recom-  
mendations. The report contains one table that lists a variety of water- and land-  
use activities, their effects on aquatic resources, and some possible solutions to  
the problems created. [7 references]

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 23

9.19

WATER POLLUTION IN LAKE MICHIGAN BY TRACE ELEMENTS  
FROM POLLUTION AEROSOL FALLOUT

Winchester, John W., and Gordon D. Nifong (University of Michigan, Ann Arbor, MI  
48104, U.S.A.)  
Water, Air, and Soil Pollution 1, No. 1, 50-64 (Nov. 1971)

This paper presents a partial inventory of air pollution emissions for 30  
trace elements for the Chicago, Milwaukee, and northwest Indiana metropolitan  
areas (based on published information). The authors suggest that certain trace  
elements which are strongly associated with air pollution sources in the Lake  
Michigan basin may be contributing significantly to lake water pollution by an  
atmospheric fallout route. The evidence presented in this report indicates that  
the atmosphere may now be a major source of Zn in Lake Michigan, and that atmos-  
pheric inputs of Cu and Ni may also be considerable.

[1 figure, 10 tables, 25 references]

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 23

LIMITING INDEXES OF THE POLLUTION OF RIVER RESERVOIRS  
WITH WASTE WATERS

Gatillo, P. D. (Nauchno-Issled. Inst. Vodn. Probl., Minsk, U.S.S.R.)  
Chemical Abstracts 76, No. 2, 6448t (Jan. 10, 1972)

9.19

9.19

DEVELOPMENT OF BIODEGRADABLE ANALOGUES OF DDT

Metcalfe, Robert L., Inder P. Kapoor, and Asha S. Hirwe  
Chemical Technology 2, No. 2, 105-109 (Feb. 1972) (American Chemical Society, 1155  
Sixteenth Street, Washington, DC 20036)

Persistent, biodegradable insecticides should be developed that would be of  
the same order of durability as DDT on foliage, animal bodies, and interiors of  
habitats, but when taken into the bodies of living organisms will be rapidly  
degraded biochemically and excreted. In this article, the authors demonstrated  
that biodegradability can be imparted to such persistent compounds as DDT by add-  
ing specifically designed handles to the basic molecule that permit it to become  
a substrate for the multifunction oxidase enzymes. These enzymes, they state,  
convert lipid partitioning substrates into more water-soluble molecules that are  
excreted from animal bodies rather than being stored in fatty tissues and con-  
centrated through ecological magnification.

[2 figures, 4 tables, 17 references]

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This is a preliminary report of a fish growing in a minimum  
space.

Carmouche, William Jeter (Baton Rouge, La.) (pat.)  
U.S. Patent 3,638,616

FISH-GROWING AQUARIUM

9.16

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 23

9.2

THE UNITED STATES IN A CHANGING WORLD ECONOMY

Peterson, Peter G.

Available from the Superintendent of Documents, U.S. Government Printing Office,  
Washington, DC 20402 (1971), 249 pp. Order No. S/N 4000-0271. Price \$3.25  
per set.

Selected U.S. Government Publications 1, No. 6, Item 64F (1972)

This publication consists of two volumes. Volume I, "A Foreign Economics Per-  
spective" is a personal overview of the origins and possible policy implications  
of the new world economy, as seen by Mr. Peter G. Peterson. Volume II contains  
the background material which provided the basis for Mr. Peterson's briefings to  
the President and the Council on International Economic Policy during the year 1971.  
It includes 72 color chart portrayals of statistical data. Topics treated in this  
new, comprehensive study, looking ahead to the International Economy of the 1970's,  
include: Trade Trends; World Tariff Barriers; Balance of Payments; U.S. Foreign  
Direct Investment Abroad; Less Developed Countries; U.S. Use of Natural Resources;  
and OECD Countries Role in the World Economy.

Reprinted

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 23

HEAVY-METAL CONTAMINATION

Merlini, Margaret (Biol. Div., EURATOM Jt. Res. Cent., Ispra, Italy)  
Chemical Abstracts 76, No. 2, 6448t (Jan. 10, 1972)

9.19

Carpenter, Edward J., and K. L. Smith, Jr. (Woods Hole Oceanographic Institution, Woods Hole, MA 02543)  
Science 175, No. 4027, 1240-1241 (Mar. 17, 1972)

In the course of studies involving sampling the pelagic *Sargassum*, the authors found plastic particles in their neuston (surface) nets. These plastic particles were found in amounts averaging 3,500 pieces (290 grams) per square kilometer in the western Sargasso Sea. They found that the pieces of plastic were brittle (probably due to the weathering of the plasticizers), and that many were in a pellet shape about 0.25 to 0.5 cm. in diameter. The pieces served as surfaces for the attachment of diatoms and hydroids. Because plastics contain considerable concentrations of polychlorinated biphenyls as plasticizers, the authors suggest that the plastics could be a source of some of the polychlorinated biphenyls recently found in ceanotic organisms.

[12 figures, 1 table, 35 references]	Fig
Fig	[12 figures, 1 table, 35 references]

central Oklahoma.  
[12 figures, 1 table, 35 references]

Environmental Science & Technology 6, No. 2, 135-142 (February 1972)





[26 footnotes]

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[119 footnotes]

Two solutions to the Indian fishing rights problem are suggested.

As provided in the Constitution of the United States, treaties entered into by this Nation are the "supreme law of the land." That the agreements with the Indians--the author indicates--are treaties is too well supported by Supreme Court decisions to be questioned. Under the construction of the treaties with the Indians, the author states that a clear conflict exists between the states' regulatory schemes and the Indians' [fishing] treaty rights. Furthermore, he indicates

Washington Law Review 47, No. 2, 207-236 (1972)

Johnson, Ralph W.

THE STATES VERSUS INDIAN OFF-RESERVATION FISHING:  
A UNITED STATES SUPREME COURT ERROR

SELDEN REDIVIVUS -- TOWARDS A PARTITION OF THE SEAS

9.3

Friedmann, Wolfgang (Columbia University School of Law)

American Journal of International Law 65, No. 5, 757-770 (Oct. 1971)

The author concludes that the creation of an International Seabed Authority with jurisdiction extending much beyond the abyssal depths is unlikely in the foreseeable future. He believes that, in matters of conservation and pollution, there should be not only a widening of international agreements on standards, but the setting up, with the least possible delay, of an international conservation and pollution control authority. Although the direct powers of such an agency would be confined to the international seas beyond national jurisdiction, its standards could be extended to national jurisdictions by virtue of a series of agreements with the coastal states.

Furthermore, should extension of effective international conservation and pollution controls fall in the foreseeable future, the author believes further extension of national jurisdictional claims (that is, of national sovereignty) vertically extended from surface to subsoil appears inevitable. However, it may be possible to reach a compromise by which territorial waters are kept at the present generally accepted limit while the coastal states are given the power to extend pollution and conservation controls for a further 100-mile stretch (such as the recent Canadian pollution and conservation control legislation). The author indicates that perhaps the creation of such exclusive conservation and pollution control zones would give impetus to more energetic and effective international control measures and institutions.

Finally, he suggests that the exploitation of mineral resources and certain fisheries should, subject to agreed conservation and pollution standards, be carried out by bipartite or multipartite joint ventures.



9.3  
(9.2)

UNCOMMON CONTROVERSY: FISHING RIGHTS OF THE MUCKLESHOOT,  
PUYALLUP, AND NISQUALLY INDIANS

Edited by the American Friends Service Committee. Published by the University of Washington Press, Seattle, Wash. (1970), xxxi + 232 pp. Price \$2.50  
Lord, William B. (Department of Agricultural Economics, University of Wisconsin, Madison, WI 53706) (reviewer)  
Transactions of the American Fisheries Society 101, No. 1, 136-137 (January 1972)

The introduction by Walter Taylor discusses the exploitative attitude towards nature (characteristic of Western culture) and the view of man living in harmony with nature (characteristic of American Indian culture). The first three chapters give a historical account of the relationship between Indian and non-Indian fishing rights from the earliest days of European exploration through the mid-nineteenth century treaty period to the present. A chapter on the law of Indian fishing rights was prepared by William Hanson. Two chapters contain information on the current status of the Indian fishing rights dispute and discuss the causes of depletion of the salmon runs. The final chapter discusses the value of diversity in natural ecosystems and in sociocultural systems. The authors suggest the establishment of a commission to allocate the salmon resource and to ensure against overfishing.

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 27

9.3  
(9.17)

CONVENTION DRAFTED FOR CONSERVATION OF ANTARCTIC SEALS

Anonymous

Department of State Bulletin 66, No. 1708, 456 (Mar. 20, 1972)

A delegation from the United States including representatives from private conservation organizations, together with the delegations from the 11 other signatories of the Antarctic Treaty of 1959 (Argentina, Australia, Belgium, Chile, French Republic, Japan, New Zealand, Norway, Republic of South Africa, U.S.S.R., United Kingdom), participated in a conference in London from February 3 to 11 which produced an agreed text of a Convention for the Conservation of Antarctic Seals.

This convention sets conservative total limits, based on seal population estimates of Antarctic scientists, for the taking of three species in any one year (crabeater, 175,000; leopard, 12,000; Weddell, 5,000) and forbids the killing or capturing of three other species (Ross, southern elephant, and fur seals of the genus *arctocephalus*). It also sets up reserve areas where sealing is prohibited and forbids the killing or capturing of seals in the water, except in limited quantities for scientific research.

The convention is to be open for signature from June 1 to December 31, 1972.  
Reprinted in part

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 27

9.6  
(9.17)

1972 CONSERVATION DIRECTORY

Anonymous

Newsletter of the American Fisheries Society 16, No. 74, 6 (Jan.-Feb. 1972)

The 1972 issue of the Conservation Directory published by the National Wildlife Federation is now available. Copies may be obtained from the National Wildlife Federation, 1412 - 16th Street, N.W., Washington, DC 20036, for \$2.00. The Directory contains a comprehensive listing of natural resource organizations, agencies, and officials in the conservation field. It has entries for more than 1,500 groups and 7,000 individuals. Other sections list congressional committees, federal and state agencies, and international, national, and interstate conservation organizations in the United States and Canada. Also, included are a guide to major colleges offering professional training for careers in conservation and an index to periodicals of interest.

FTP

FAO Fisheries Synopsis No. 85, 79 pp. (Dec. 1971) Food and Agriculture Organization of the United Nations, Rome, Italy (Distribution restricted)  
84112)

Hirth, Harold F. (Department of Biology, University of Utah, Salt Lake City, UT

CHELONIA MYDAS (LINNAEUS) 1758

SYNOPSIS OF BIOLOGICAL DATA ON THE GREEN TURTLE

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 27

9.1

9.6  
(1.)

THE LIVING RESOURCES OF THE WORLD OCEAN

Moiseev, P. A.

Izdatel'stvo "Pishchevaya Promyshlennost," Moskva, 1969. (In Russian)

Translated by N. Kaner and W. E. Ricker; edited by B. Golek, Israel Program for Scientific Translations, Jerusalem, Israel (1971), v + 334 pp. Available from the U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22151.

The chapters include (1) Man's need for the biological resources of the ocean, (2) Certain properties of the oceans as producers of biological resources, (3) Production of biological resources, (4) Effectiveness of utilization of energy at different trophic levels, (5) Biological productivity of the ocean, (6) Utilization of biological resources of the ocean, (7) Marine and oceanic fisheries of the U.S.S.R., (8) Some aspects of international fishery problems, (9) Some ways to increase biological productivity of the ocean, and (10) Conclusion. [108 figures, 150 tables, 245 references to Russian publications, 152 references to publications in other languages, 4 appendices]

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 6 PAGE 27

LEGAL ASPECTS OF SEABED PETROLEUM AND MINERAL RESOURCE DEVELOPMENT--THE DRAFT UNITED NATIONS CONVENTION ON THE INTERNATIONAL SEABED AREA AND THE UNITED STATES WORKING PAPER SUBMITTED TO THE UNITED NATIONS SEABED COMMITTEE

9.3

Authors and titles as listed below

Natural Resources Lawyer 4, No. 4, 7, 4, No. 4, 681-747 (Nov. 1971)

This issue contains some of the papers on the subject presented at the Offshore Technology Conference in Houston, Tex., on April 19-20, 1971. The papers consist of opening remarks by Hollis D. Hedberg and individual comments of John R. Stevenson, of David R. Stang, of Leigh Ratiner, of T. S. Ary, of Thomas A. Clingan, Jr., of Fernando Zeger, and of John R. Freeland, and the following articles: "The Outer Continental Shelf Lands Act--Its Adequacies and Limitations," by Raymond C. Coulter (Department of the Interior, Washington, D.C.), pp. 725-731. "Offshore Boundary and Title Issues," by Austin W. Lewis (Lisko and Lewis, New Orleans), pp. 737-746.

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[13] footnotes

[23 footnotes]  
Nishi, Toshio (University of Washington, Seattle, WA 98105)  
Natural Resources Journal 11, No. 4, 657-673 (October 1971)

THE VOLUNTARY ABSTENTION PRINCIPLE AND JAPAN:  
SOME LEGAL AND POLITICAL IMPLICATIONS

9.3

THE PREPARATION OF THE CONVENTION ON THE CONTINENTAL SHELF

9.6

(1961) 503-542, 2, No. 3, 6, 20520 (Jan. 1961)  
Bernard H. H. (U.S. State Department of Commerce, Washington, DC 20520)

The purpose of this study was to examine the background of article 1 of the Convention of the Continental Shelf as revealed by the official records of the International Law Commission and the United Nations Conference on the Law of the Sea. Article 1 defines the term "continental shelf." Reports on the remaining issues of this study appear in the April and July issues of this journal.

FTP

[13] footnotes

In this article the author reviews many of the rules, legal and fictitious, and institutions that deal with the problem of states' offshore claims and competences, and he also examines some of the novel claims that states have made in their effort to exercise exclusive authority over offshore areas.

FTP

Goldie, Louis F. E. (College of Law, Syracuse University, N.Y.)  
Naval War College Review 24, No. 6, 43-66 (Feb. 1972)

INTERNATIONAL LAW OF THE SEA -- A REVIEW  
OF STATES' OFFSHORE CLAIMS AND COMPETENCES

9.3

Anonymous  
Published by the Oceanographer of the Navy. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (1971), 214 pp., Order No. S/N 0842-0053. Price \$1.75.  
Selected U.S. Government Publications 1, No. 6, Item 53F (1972)

9.7

UNIVERSITY CURRICULA IN THE MARINE SCIENCES AND RELATED FIELDS,  
ACADEMIC YEARS 1971-1972 AND 1972-1973

Anonymous

Published by the Oceanographer of the Navy. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (1971), 214 pp., Order No. S/N 0842-0053. Price \$1.75.  
Selected U.S. Government Publications 1, No. 6, Item 53F (1972)

This report contains information on a wide diversity of curricula offered at 134 academic institutions throughout the country. It is published by the Oceanographer of the Navy in the hope that it will be of assistance to students in planning careers in the marine sciences.

Reprinted

FTP  
The author describes seven computer systems for information handling taken from over 30 computer-aided technical information services and functions currently in operation. The information system developed at the author's company leans heavily on computers. A project of UNESCO and the International Council of Scientific Unions (ICSU) known as Unisist includes plans for a worldwide system of science information in which computer techniques are used. The author believes that the effectiveness of computers in information systems will become evident during the next 10 years. [1 figure, 14 references]

FTP

Lowry, W. Kenneth (Libraries and Information Systems, Bell Laboratories, Murray Hill, NJ 70974)  
Science 175, No. 4024, 841-846 (Feb. 25, 1972)

9.7 USE OF COMPUTERS IN INFORMATION SYSTEMS

OUR CHANGING FISHERIES

9.6

Sidney (editor)  
Published by the National Marine Fisheries Service, NOAA, U.S. Department of Commerce  
Price \$9.00. 435 pp. (1972)

In a news release dated March 15, 1972, the U.S. Department of Commerce announced publication of the book "Our Changing Fisheries." The book contains 30 chapters, prepared in popular style, on the commercial fisheries authored by the staff of the National Marine Fisheries Service. Some of the topics that are covered include fishery food science, exploratory fishing, gear research, economics of fisheries, and resource management. The book may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FTP  
This article lists 56 original research papers published during the period. The papers are classified into the following groups: fry, culture, feed and fertilization, benthic algae, pest and disease, ecology, and "others." The titles are in English and Chinese. The authors' names and references are in the original language of the journal or article.

Chen, Huet-Pin (Tungkang Marine Laboratory, Taiwan Fisheries Research Institute)  
Aquaculture 1, No. 4, 23-28 (Dec. 1971)

LIST OF REFERENCES ON MILKFISH, CHANOS CHANOS (FORSKAL),  
(9.16) IN TAIWAN (1952-1971)

9.6



2.3 METHOD AND APPARATUS FOR REMOVAL OF OIL FROM SURFACE OF FRIED FOOD PRODUCTS

Davidson, Arthur R. (West Limn, OR 97068), and John E. Haubner (Tigard, OR 97223); assigns to Lamb-Weston, Inc., Portland, Ore. (pat.)  
U.S. Patent 3,627,535  
Official Gazette of the U.S. Patent Office 893, No. 2, 660 (Dec. 14, 1971)

Oil is removed from the surface of foods cooked in hot oil. Just after the food products are cooked, they are subjected to a blast of air saturated with water vapor.

FTP

In this apparatus for deep fat frying of breaded foodstuffs, the foodstuff is supported in such a way for a period of time to allow the coating to become adequately cooked. Thus, the foodstuffs do not adhere to each other or to the cooking apparatus during the subsequent cooking stage.

CONTINUOUS FRYING DEVICE

Smith, Benjamin R. and Ernest R. Pridham (Lunenburg, Nova Scotia, Canada); assignors to National Sea Products Ltd., Halifax, Nova Scotia, Canada (pat.)  
U.S. Patent 3,671,569  
Official Gazette of the U.S. Patent Office 894, No. 3, 131 (Jan. 18, 1972)

2.115 BOAT HULL

Boome, Martin W. (Truro, Nova Scotia, Canada) (pat.)  
Canadian Patent 894,009  
Patent Office Record (Canada) 100, No. 9, 869 (Feb. 29, 1972)

The bottom of the hull is shaped to form a longitudinal air-water channel; at the stern portion of the hull the air-water channel is divided into two transversely spaced air-water passages open at a transom.

FTP

This fishing trap enclosure has a trapping section and a storage section connected by a gate. Long-range directional sonic devices are appropriately spaced so as to concentrate the fish into the gathering area. Other directional sonic devices drive the fish into the trap.

Stein, Julian (Franklin Square, NY 11010) (pat.)  
U.S. Patent 3,638,346  
Official Gazette of the U.S. Patent Office 895, No. 1, 35 (February 1, 1972)

FISHING TRAP

(2.1124)  
(2.1174)

0.8 OIL RECOVERY AND CLEANUP SYSTEM

(9.19)  
Parker, James H. (P.O. Box 1652, Norfolk, Va.) (pat.)  
U.S. Patent 3,642,140  
Official Gazette of the U.S. Patent Office 895, No. 3, 923 (Feb. 15, 1972)

This unit is used to recover oil floating on the surface of water.

FTP

By means of this apparatus and system, oysters from contaminated waters can be cleansed and rendered marketable.

(1972) Feb. 15, No. 3, 883 Patent Office 895, No. 3, 923 (Feb. 15, 1972)

Woodridge, David D., and Joseph Clyde Kitchel, and William R. Garrett (Brevard County, Fla.); assignors to National Shellfish Processors, Inc., Brevard County, Fla. (pat.)  
U.S. Patent 3,686,179  
Official Gazette of the U.S. Patent Office 895, No. 3, 923 (Feb. 15, 1972)

BIVALVIA DEPURATION SYSTEM

(61.6)  
8.0

0.6 SYNTHETIC SEA URCHIN EGG PASTE

Eisai Co. Ltd. (pat.)  
Japanese Patent 33700/71  
Food Technology 26, No. 2, 62 (Feb. 1972)

A synthetic sea urchin egg paste is prepared from egg whites.

FTP

chopped green bell pepper and can be used for flavoring food products.

2-Methoxy-3-isobutylpyrazine is produced by reacting leucine amide with glyoxal to produce the intermediate 2-hydroxy-3-isobutylpyrazine; then, the intermediate is methylated. The new compound gives off an intense aroma of freshly

Buttery, Ron G. (Richmond, Calif.), Richard M. Seifert (El Cerrito, CA 94530), Robert E. Lundin (Berkeley, Calif.), and Dante G. Guadagni (Moraga, CA 94556); assignors to the United States of America as represented by the Secretary of Agriculture (pat.)  
U.S. Patent 3,630,750  
Official Gazette of the U.S. Patent Office 893, No. 4, 1436 (December 28, 1971)

FOOD-FLAVORING METHOD AND COMPOSITION USING 2-METHOXY-3-ISOBUTYLPYRAZINE

0.6

<p>0.8 (2.3)</p> <p>PROCESS IN PLANT ODOR IMPROVEMENT</p> <p>Nippon Synthetic Chemical Ind. Co. Ltd. (pat.) Japanese Patent 30319/71 Food Technology <u>26</u>, No. 1, 81 (January 1972)</p> <p>Air from fish and meat processing plants is washed with an aqueous solution containing Glyoxal.</p> <p>0.8</p> <p>SCRUBBING METHOD AND APPARATUS</p> <p>Mare, Ernest (Johannesburg, Transvaal, Republic of South Africa); assignor to J. Ronald Herschberger, Palo Alto, Calif. (pat.) U.S. Patent 3,626,667 Official Gazette of the U.S. Patent Office <u>893</u>, No. 2, 445 (December 14, 1971)</p> <p>This gas scrubbing method and apparatus is designed to be used where it is necessary to obtain intermixing of liquid droplets and a gas.</p> <p>FTP</p>	<p>3.33</p> <p>ASEPTIC PACKAGING OF FOODS</p> <p>Robinson, David V. (Laurel, MD 20810); assignor to Donald A. Rosini, Shamokin, PA 17110, a part interest (pat.) U.S. Patent 3,643,586 Official Gazette of the U.S. Patent Office <u>895</u>, No. 4, 1308 (Feb. 22, 1972)</p> <p>The foods are sterilized, then they are packaged under aseptic conditions in presterilized containers.</p> <p>FTP</p>
<p>0.8</p> <p>RECOVERY OF PROTEINACEOUS MATERIAL FROM WASTE EFFLUENTS</p> <p>Felicetta, Vincent F., and Robert O. Peacock (Georgia-Pacific Corp.) U.S. Patent 3,622,510 (Nov. 23, 1971) Chemical Abstracts <u>76</u>, No. 6, 27817c (Feb. 7, 1972)</p> <p>Pieces of raw fish are coated with a mixture of sugar, salt, sodium glutamate, sodium succinate, an antioxidant, and potassium sorbate. The coated pieces are held for 10 to 16 hr. and then they are subjected to the action of brewers yeast. Finally, the coated pieces are dried, baked, and seasoned.</p> <p>FTP</p> <p>2.3</p> <p>OYSTER OPENING DEVICE</p> <p>Reinke, Theodore S. (Cambridge, Md.) (pat.) U.S. Patent 3,631,567 Official Gazette of the U.S. Patent Office <u>894</u>, No. 1, 771 (Jan. 4, 1972)</p> <p>This device is used to shuck oysters.</p> <p>FTP</p> <p>2.3</p> <p>SHRIMP-PEELING MACHINE</p> <p>Mathiesen, Erik Hedeager (Langemosevej 26, 2880 Bagsvaerd, Denmark) (pat.) U.S. Patent 3,634,909 Official Gazette of the U.S. Patent Office <u>894</u>, No. 3, 870 (Jan. 18, 1972)</p> <p>In this machine for peeling shrimp, the shrimp advance in a channel formed by two counterrotating rollers.</p> <p>FTP</p>	<p>3.33</p> <p>STERILIZATION</p> <p>Unilever Ltd. (N.J.A. Van den Hemel) (pat.) British Patent 1,247,860 BFIIRA Abstracts <u>24</u>, No. 11, Abstract No. 3866, 788 (November 1971)</p> <p>A method of sterilization of hermetically sealed containers which are not as robust as cans--e.g., aluminum foil cartons which may be plastic coated. The containers are held in moulds and passed through a tube whilst in contact with each other. They are heat treated in the tubes and the moulds help to compensate for the increased pressure in the containers during heating. Reprinted</p> <p>4.59</p> <p>FOOD COMPOSITIONS CONTAINING MICROCRYSTALLINE COLLAGEN</p> <p>Battista, Orlando A. (Yardley, PA 19067); assignor to FMC Corporation, New York, N.Y. (pat.) U.S. Patent 3,632,350 Official Gazette of the U.S. Patent Office <u>894</u>, No. 1, 275 (Jan. 4, 1972)</p> <p>These food compositions contain a new physical form of collagen. The microcrystalline collagen is edible, is bland in taste, and is indistinguishable in the food compositions.</p> <p>FTP</p> <p>4.59</p> <p>METHOD OF PRODUCING PROTEINACEOUS FIBERS</p> <p>Arima, Tetsuo (Ikeda, Osaka, Japan), and Yoichi Harada (Kawanishi, Hyogo, Japan); assignors to General Foods Corp., White Plains, N.Y. (pat.) U.S. Patent 3,627,536 Official Gazette of the U.S. Patent Office <u>893</u>, No. 2, 660 (Dec. 14, 1971)</p> <p>Edible protein fibers are prepared by drying raw collagen. The raw collagen is prepared by refining animal waste tissues (tendons, sinews, and skin).</p> <p>FTP</p> <p>6.54</p> <p>PROTEIN FIBER PRODUCTION</p> <p>Taiyo Fishery Co. Ltd. (pat.) Japanese Patent 29776/71 Food Technology <u>26</u>, No. 1, 86 (January 1972)</p>



# ADJUSTABLE PURSE RING STRIPPER

2.1125  
(2.1475)

Whaley, Morris L. (Bonita, CA 92002) (pat.)  
U.S. Patent 3,638,345  
Official Gazette of the U.S. Patent Office 895, No. 1, 34 (February 1, 1972)

In the process of recovering a purse seine containing fish, a pickup line is passed through the gathered purse rings and is attached at one end to a prong mounted on the side of the boat. The rings are made to slide on the prong by hoisting the other end of the pickup line, thus they are retained in order without the need for manual handling. Furthermore, when the empty net is stowed, the rings strip off the prong in proper order.

FTP

FTP

# MOUNTING MECHANISM FOR A SEINE-HAULING POWER BLOCK

2.1125  
(2.1475)

Demmert, Lawrence E. (3408 Redwood Ave., Bellingham, WA 98225) (pat.)  
U.S. Patent 3,643,365  
Official Gazette of the U.S. Patent Office 895, No. 4, 1250 (Feb. 22, 1972)

A trolley carrying the seine-hauling power block can be driven along an elongated track having its length extending athwartships of a boat. A carriage supporting such athwartships track can be driven along a fore-and-aft boom and the block trolley can be driven along the athwartships track so as to lay the seine back and forth in a pile below the block as it is hauled in.

# APPARATUS FOR THE STERILIZATION OF FOOD PRODUCTS

2.3

Vallee, Felix Alexandre Jules (7 rue Marcel Renault, Paris, 17eme, France) (pat.)  
U.S. Patent 3,661,617  
Official Gazette of the U.S. Patent Office 895, No. 3, 697 (Feb. 15, 1972)

With this apparatus, food products contained in loosely sealed receptacles are sterilized. The receptacles containing the food are placed in an autoclave, then a vacuum is drawn and steam is introduced to effect sterilization of the food. After the product is sterilized, the pressure in the autoclave is reduced by drawing off or condensing the steam, during which time the food product is cooled. Finally, a sterile inert gas is introduced into the autoclave to balance out the pressure and the receptacles are sealed before they are brought into contact with outside air.

organisms (shrimp).

FTP

This apparatus is used to peel, dehead, devein, and otherwise clean marine organisms (shrimp).

# SHRIMP-PROCESSING APPARATUS

2.3

Welcker, Clyde J., and Roland Welcker (New Orleans, La.; assigns to the Welcker Corp., New Orleans, La.) (pat.)  
U.S. Patent 3,639,946  
Official Gazette of the U.S. Patent Office 895, No. 2, 403 (Feb. 8, 1972)

# FREEZE-DRYING APPARATUS

3.61

Oetjen, G. W., F. J. Schmitz, H. Eilenberg; Leybold-Heraeus-Verwaltung G.m.b.H. (pat.)  
U.S. Patent 3,612,411  
Food Technology 26, No. 1, 86 (January 1972)

This is a continuous freeze-drying apparatus.

# FREEZING PROCESS

3.61

Certified Mfg. Co. (pat.)  
British Patent 1,244,580  
Food Technology 26, No. 1, 86 (January 1972)

The food is frozen by passing it through a tunnel into which liquid carbon dioxide is sprayed.

FTP

The vacuum chamber of this freeze-drying apparatus contains vertical panels of radiating heating elements between which pass vented containers of foodstuffs.

FTP

# FREEZE-DRYING APPARATUS

3.61  
COMMERCIAL FISHERIES ABSTRACTS  
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Leybold-Heraeus-Verwaltungs G.m.b.H. (pat.)  
British Patent 1,242,380  
Food Technology 26, No. 1, 86 (January 1972)

# METHOD OF GROWING OYSTERS

(18.1)  
91.6

Budge, William W. (Hillsborough, CA 94010), and Malcolm Donald (Woodside, CA 94062); assignors to Pacific Mariculture, Inc., Pescadero, CA 94060 (pat.)  
U.S. Patent 3,638,615  
Official Gazette of the U.S. Patent Office 895, No. 1, 105 (Feb. 1, 1972)

In this method for growing oysters in sea water, the seed oysters are secured to a member of the apparatus using an adhesive. Also, the oysters are arranged in a predetermined pattern and are so spaced that they can grow to a substantially large size without deforming each other.

FTP

The system contains removable filter units consisting of environmental support material holding captured worms, or great numbers of monosex fish.

# METHOD OF PURIFYING CITRUS PLANT EFFLUENT AND RAISING WORMS AND FISH

9.16

Golub, Gerald (Winter Park, FL 32789) (pat.)  
U.S. Patent 3,635,816  
Official Gazette of the U.S. Patent Office 894, No. 4, 1093 (Jan. 18, 1972)

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Assisted, (pat.)	19	9.17	Coulter, Raymond C.	28	9.3	Han, I. K.	11	6.190	Koski, K. V.	18	9.13
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Assisted, (pat.)	26	9.2	Demmert, Lawrence E. (pat.)	31	2.1125	Hayes, Eugene F.	29	2.3	Kuksis, A.	11	4.11
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Assisted, (pat.)	28	9.7	Dill, William A.	23	9.19	Heath, R. G.	5	0.6	Kytōkangas, R.	14	7.595
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Assisted, (pat.)	30	2.3	Dole, Hollis M.	25	9.3	Hester, F. J. J.	10	3.2383	Lee, N. H.	11	6.190
Assisted, (pat.)	30	3.33	Donald, Malcolm (pat.)	31	9.16	Hirth, Harold F.	14	7.8	Levi, Donald R.	20	9.19
Assisted, (pat.)	30	6.54	Dooley, Calvin J.	2	0.34	Hirwe, Asha S.	7	2.1475	Lewis, Austin W.	28	9.3
Assisted, (pat.)	31	3.61	Durand, Henri	14	7.53	--	17	9.1	Liston, J.	3	0.5
Assisted, (pat.)	31	3.61	Ehrhardt, J.-P.	8	2.9	Hoekstra, W. G. G.	17	9.13	--	4	0.5
Assisted, (pat.)	30	6.54	Eilenberg, H. (pat.)	31	3.61	Holdsworth, S. D.	23	9.19	Lloyd, A. K.	7	2.3
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Assisted, (pat.)	10	4.5	Ellis, Giuseppe	12	7.42	Howard, George C. (pat.)	10	3.6	Lord, William B. (rev.)	27	9.3
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Assisted, (pat.)	2	0.32	Falls, C. Paul	24	9.19	Hughes, P.	19	9.19	Loynes, R.	28	9.7
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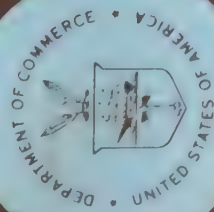
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JULY 1972

VOLUME 25

NUMBER 7

Seattle, Wash.



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### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

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# 0.4 NITROSAMINES -- AN ENVIRONMENTAL HAZARD?

Walters, C. L.  
Technol. Ireland 3, No. 8, 17-19 (1971)  
BEMIRA Abstracts 25, No. 2, Abstract No. 472, 99 (Feb. 1972)

A discussion of the occurrence of nitrosamines in the human environment and the present state of investigation of their properties and effects is given.  
C.S.B.  
Reprinted

DLF

71 figures, 1 table, 2 references

The researchers demonstrated that each of the two dissimilar fragments comprising the diphtheria toxin molecule has a separate and distinct function. Further, the toxicity of the toxin depends upon the unique enzymic activity associated with fragment A. This enzymic activity, they indicate, is responsible for the arrest of polypeptide chain elongation in sensitive cells by specific ADP-ribosylation of translocase; however, fragment A can only reach the sensitive cell cytoplasm when it is specifically associated with fragment B.

Uchida, Tsuyoshi, Jr., and Annabel Avery Harper (Biol. Laboratories, Harvard University, Cambridge, MA 02138)  
(1971, Feb. 25, '75, 106-106, '4207, No. 11, Science 171, 1171-1172)

RECONSTITUTION OF DIPHTHERIA TOXIN FROM TWO NONTOXIC CROSS-REACTING MUTANT PROTEINS (63.0)

1 PAGE 7 ON 52 TOA SDVSTRAB FISHES TWIDMCO

0.38  
(0.35) ESTERASE POLYMORPHISM IN VITREOUS FLUID OF PACIFIC HAKE, MELUCCICUS PRODUCTUS

Utter, Fred M., Clyde J. Stromont, and Harold O. Hodgins (Biol. Lab., Bur. Commer. Fish., Seattle, Wash.)  
Chemical Abstracts 76, No. 5, 23271x (Jan. 31, 1972)

DLF

6 figures, 2 tables, 23 references

The authors describe the synthesis and interaction of a spin-labeled analog of 1,10-ortho-phenanthroline with horse liver alcohol dehydrogenase. They confirmed that 1,10-phenanthroline forms a 1:1 complex with only the two catalytic zincs of the enzyme. The two sulphydryl groups of horse liver alcohol dehydrogenase presumably associated with enzyme activity have been labeled with two iodoacetamide spin labels with different chain lengths. The authors indicate that the results suggest that zinc and at least one of the sulphydryl moieties are in close association at the active site.

Spallholz, J. E., and L. H. Piette (Department of Biochemistry and Biophysics, School of Medicine, University of Hawaii, Honolulu, Hawaii 96822)  
Archives of Biochemistry and Biophysics 148, No. 2, 596-606 (Feb. 1972)

INTERACTION OF SPIN-LABELED ANALOGUES OF 1,10-PHENANTHROLINE AND IODOACETAMIDES WITH HORSE LIVER ALCOHOL DEHYDROGENASE (0.35)

0.38

0.32

PHYSICOCHEMICAL BEHAVIOR OF FISH MEAT PROTEINS. III. PRESENCE OF  $\beta$ -CHAINS OF PROTEIN IN KAMABOKO

Niwa, Eiji, and Masato Miyake (Fac. Fish., Prefect. Univ. Mie, Tsu, Japan)  
Chemical Abstracts 76, No. 7, 32968g (Feb. 14, 1972)

DLF

21 figures, 2 tables, 2 references

The author states that a threshold level of biological activity exists within a cell at 10 atoms. It is suggested that a threshold level of biological activity exists upon a local level in a structural unit of a molecule. If interactions occur at discrete points, whether interacting with an available active site, or that similar probabilities govern the probability of the foreign atom may be related to the probability of the atom of the molecule that does not consider the presence of interfering substances. Further, the belief that molecules cause an unstable effect does not consider the presence of a single molecule in a cell of a definite population. The author ignores several concepts. Because of stochastic considerations, the presence in a cell of a single molecule is a definite population effect. The author states that equating the presence of a biological effect with a deleterious implication ignores several concepts.

(1971, February 16, 647-647, 1204, No. 1, Science 171, 1171-1172)  
Bertram D. (Institute of Environmental and Industrial Health, University of Michigan, Ann Arbor, MI 48106)  
Dinman, (61.6)

0.321  
(8.51) STUDIES ON ROASTING CHANGES OF PROTEINS. PART I. CHANGES OF CASEIN AND LYSOZYME DURING ROASTING

Fujimaki, Masao, Hiromichi Kato, and Fumitaka Hayase (Department of Agricultural Chemistry, University of Tokyo, Tokyo, Japan)  
Agricultural and Biological Chemistry 36, No. 3, 416-425 (Mar. 1972)

The purpose of this study is to investigate the changes that occur in proteins under roasting conditions at 150°-300° C. and the interaction of proteins with carbohydrates or lipids from the point of view of food chemistry.  
[10 figures, 4 tables, 21 references]

SW

FTF

1 figure, 2 tables, 16 references

The skeletal muscle of the porpoise contained about 10 times more myoglobin than did that of the sea-cow. The myoglobin concentrations of the cardiac muscles of the two mammals were only slightly different. There appears to be a close relationship between the myoglobin concentration in the muscle and the habits of marine mammals.

STUDIES ON THE CONCENTRATION OF MYOGLOBIN IN THE SEA-COW AND PORPOISE (15.2)

0.32



0.38 (0.5) ACID PHOSPHATASE ACTIVITY IN VEGETATIVE CELLS AND SPORES OF CLOSTRIDIUM BOTULINUM TYPE E

Strasidine, G. A., and Joanne M. Melville (Fisheries Research Board of Canada Vancouver Laboratory, Vancouver, British Columbia)  
Journal of the Fisheries Research Board of Canada **28**, No. 11, 1817-1820 (Nov. 1971)

In a previous study a glucanlike polysaccharide accumulation was demonstrated in the vegetative cells of C. botulinum type E. In studying the biosynthesis of glucan an active phosphatase enzyme system was found. This system catalyzed the liberation of orthophosphate from glucose-1-phosphate and the chromogenic phenolic ester, P-nitrophenyl phosphate. In another study it was demonstrated that sporulation is initiated during the latter stage of glucan accumulation and coincides with the exhaustion of exogenous glucose, depletion of intracellular  $P_i$ , and an increase in activity of acid phosphatase. The author suggests that the participation of acid phosphatase enzyme in the sporulation process should be considered in attempts to determine the role of the enzyme in cell metabolism.

[4 figures, 13 references]

SW

Chemical Abstracts **76**, No. 7, 31847e (Feb. 14, 1972)

Fattoum, Abdellatif, Ridha Kassab, and Louise A. Pradel (Lab. Biochim. Gen. Comp., Coll. France, Paris, France)

0.38 EFFECTS OF IODINATION AND ACETYLTATION OF TYROSYL RESIDUES ON THE ACTIVITY AND STRUCTURE OF ARGININE KINASE FROM LOBSTER MUSCLE

0.38 THE INFLUENCE OF WATER CONTENT AND WATER ACTIVITY ON THE SUGAR-AMINO BROWNING REACTION IN MODEL SYSTEMS UNDER VARIOUS CONDITIONS

Eichner, Karl, and Marcus Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Journal of Agricultural and Food Chemistry **20**, No. 2, 223 (Mar.-Apr. 1972)

This study was carried out to help elucidate the influence of water content, water activity, dilution of the reactants, and of viscosity on the browning rate of reducing sugars and amino acids. By varying the glycerol content in a sugar amino acid-glycerol-water system, the researchers were able to change the water content of this system and still maintain a constant water activity, and vice versa. Thus, they were able to examine the action of water content and water activity on the browning rate separately. Determination of the influence of dilution of reactants was made possible by adding increasing amounts of glycerol to the system. In order to examine the influence of the diffusion resistance on the browning rate, the viscosity of the system was increased by adding water-soluble polymers and lowering the water activity.

The browning (Maillard reaction) in the model systems increased with increasing water content, except in the systems in which mobility of reactants became substantially impeded at low water contents. The authors indicated that the effects of water were complex and depended on the presence of various water-binding components (other factors). The fact that water content had a significant effect on the browning reaction indicates that water content is an important factor in the browning reaction.

[see references]

LLA

0.5 STUDIES ON VITAMIN B<sub>6</sub> METABOLISM IN MICROORGANISMS.

PART XI. EXTRACELLULAR FORMATION OF VITAMIN B<sub>6</sub> BY MARINE AND TERRESTRIAL MICROORGANISMS AND ITS CONTROL

Tani, Yoshiaki, Tsuyoshi Nakamatsu, Yoshikazu Izumi, and Koichi Ogata (Department of Agricultural Chemistry, Kyoto University, Kyoto, Japan)  
Agricultural and Biological Chemistry **36**, No. 2, 189-197 (Feb. 1972)

This work involved the search for and study of marine and terrestrial microorganisms that are capable of producing extracellularly relatively large amounts of vitamin B<sub>6</sub>. Two strains, identified as Flavobacterium sp. and Vibrio sp., that produced extracellularly, relatively high amounts of vitamin B<sub>6</sub> were isolated. The maximum yields of vitamin by these strains were 18  $\mu$ g. and 5  $\mu$ g. of vitamin B<sub>6</sub> per ml.

The authors also analyzed several samples of sea water for vitamin B<sub>6</sub> content and found that it was present in sea water as pyridoxine. Of 25 organic carbon compounds tested, glycerol was the most effective in influencing the production of vitamin B<sub>6</sub>. [9 figures, 24 references]

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ences. C.S.B.

Möhler, K.  
Meat Ind. Rev., Yugoslavia **3**, Nos. 3-4, 21-22 (1971) (In German)  
BPMIRA Abstracts **25**, No. 2, Abstract No. 473, 99-100 (Feb. 1972)

A note on the occurrence of nitrosamines in meat products with seven references.

0.4 THE OCCURRENCE OF NITROSAMINES IN MEAT PRODUCTS AND THEIR SIGNIFICANCE IN HUMAN HEALTH

0.38 GMINOSINOS RELEASE AFTER POISONING WITH INSECTICIDES

Maddrell, S. H. P., and S. E. Reynolds (ARC Unit of Invertebrate Chemistry and Physiology, Department of Zoology, Downing Street, Cambridge CB2 3EJ, England)  
Nature **236**, No. 5347, 474 (Apr. 21, 1972)

The authors suggest that the lethal action of insecticides is as follows: (1) disruptive effects on the central nervous system: causes paralysis or behavioral changes; (2) multiple release of neurohormones: causes derangement of many aspects of metabolism. This study indicates that insecticides cause multiple release of neurohormones. It suggests that compounds similar to insect neurohormones might be used directly as insecticides. They would have the advantage of being potent, specific, and biodegradable.

[5 figures, 1 table, 7 references]

WS

Chemical Abstracts **76**, No. 7, 31658u (Feb. 14, 1972)

More, Pol, Marie T. More, Robert Monnet, and Jeanne Pilsbeu (Lab. Zool. Biol. Anim., U.E.R. Sci. Pharm., Nantes, France)

0.38 ADENYLATE KINASE IN THE SOLUBLE PROTEINS OF THE OYSTER ADDUCTOR MUSCLE



0.5 (3.4) FACTORS IN SURVIVAL OF CLOSTRIDIUM BOTULINUM TYPE E SPORES THROUGH THE FISH SMOKING PROCESS

Alderman, G. G., Gretchen J. King, and H. Sugiyama (Food Research Institute and Department of Bacteriology, University of Wisconsin, Madison, WI 53706) Journal of Milk and Food Technology 35, No. 3, 163-166 (Mar. 1972)

Earlier work [L. N. Christiansen, J. Deffner, E. M. Foster, and H. Sugiyama, Appl. Microbiol. 16, 133-137 (1968)] revealed an unsuspected resistance of type E spores of *C. botulinum* during the smoking of fish. In the present article, the researchers show that survival of type E spores through the fish smoking process is influenced by the moisture levels of the heating environments. In their experiments, fish (chub: *Leucichthys hoyi*) were experimentally inoculated with  $1 \times 10^6$  spores of *C. botulinum* type E and the inoculated fish were given heat treatments equivalent to those used in the commercial smoke processing of these fish (the fish were heated for 30 min. at an internal temperature of 180° F. (82.5° C.) after a come-up time to processing temperature of 2.5 to 3.0 hr.). The researchers found that the percentages of fish treated in this manner and containing viable type E spores were significantly lower among those fish heated in an environment of high moisture content than among fish heated in atmospheres of low moisture content.

In thermal death time (TDT) experiments, minced raw fish and minced fish from previously autoclaved fish were inoculated with *C. botulinum* type E spores. The type E spores in the raw minced fish were more resistant to heat than were the type E spores in the minced fish from previously autoclaved fish. The authors obtained the same general result using raw and cooked egg whites. They suggest

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 3 (over)

0.5 (2.05) STAPHYLOCOCCUS AUREUS AND STAPHYLOCOCCAL FOOD INTOXICANTS. A REVIEW. IV. STAPHYLOCOCCI IN MEAT, BAKERY PRODUCTS, AND OTHER FOODS

Minor, T. E., and E. H. Smith (Department of Food Science and the Food Research Institute, University of Wisconsin, Madison, WI 53706) Journal of Milk and Food Technology 35, No. 4, 228-241 (Apr. 1972)

The authors review the outbreaks of staphylococcal intoxications involving Genoa sausage, corned beef, barbecued chicken, baked ham, fish, pastries, pie fillings, and other foods. They conclude that the real problems with staphylococcal food poisoning are not associated with the handling and preparation of foods by food processors, but instead with the mishandling of food in food service establishments and in the home. All the information which is needed to prevent outbreaks of staphylococcal food poisoning that originate in food service establishments and in the home is available. Such information must be applied to be beneficial--the consumer must be offered better training in the way foods must be handled to keep them safe. Perhaps it might be appropriate to provide such training at the high school level. [469 references]

FTP

0.6 (6.54) MANIOC

Ayres, John C. (Department of Food Science Division, University of Georgia College of Agriculture, Athens, GA 30601) Food Technology 26, No. 4, 128-132, 134, 136, 138 (Apr. 1972)

Manioc is also called cassava (English), yuca (Spanish), and mandioca (Portuguese). Sometimes the term tapioca (one of the products prepared from manioc) is used as the common name. The scientific name of the commercial species is *Manihot esculenta*, Crantz. Manioc is prepared into meal, flour, or starch for use as the major component of rural diets. It also may be used for animal feed and industrial purposes. This article describes the production, processing, and uses of manioc and its product tapioca.

Manioc starch or flour has little nutritive value other than that contributed by its carbohydrate content. Manioc is one of the major products used in the normal food patterns in tropical regions. The author suggests, therefore, that the flour plus adequate amounts of a suitable source of protein (such as fish protein concentrate, soy protein concentrate, torula yeast, or caseinate) be used for large-scale feeding. [4 figures, 4 tables, 38 references]

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 3

0.8 METHODS OF EVALUATING R&D ORGANIZATIONS

Glass, Edward M. (Defense Research and Engineering, Washington, DC 20301) IEEE Transactions on Engineering Management EM-19, No. 1, 2-12 (Feb. 1972)

R & D managers have been trying to devise better measures of the effectiveness and usefulness of organizations engaged in research and development. In this paper, the author summarizes some of the techniques used by the Department of Defense in evaluating the effectiveness of its in-house laboratory systems. The purpose of the paper is not to suggest that solutions to the problem of R & D organizational appraisal are in hand, but rather to stimulate interest and discussion in this area. [11 figures, 12 tables, 15 references]

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[16 references]

The author develops a framework for thinking about new directions in engineering education. The demand composition in the private and public sector is shifting toward engineers who can attack socially-oriented problems. This shift, the author indicates, reflects the change of our national priorities toward social programs and this shift is likely to continue.

Chen, Kan (Electrical Engineering and Environmental Systems Engineering, University of Pittsburgh, Pittsburgh, PA 15213) Technological Forecasting and Social Change 3, No. 3, 391-396 (1972)

0.8 (9.7) EXPLORING NEW DIRECTIONS IN ENGINEERING EDUCATION

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 3

<p>0.6 (9.19)</p> <p>EFFECTS OF HEATING AND COOKING METHOD ON CHLORINATED HYDROCARBON RESIDUES IN CHICKEN TISSUES</p> <p>Richey, S. J., R. W. Young, and E. O. Essary (Departments of Human Nutrition and Foods, Biochemistry and Nutrition, and Food Science and Technology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061)</p> <p>Journal of Agricultural and Food Chemistry <u>20</u>, No. 2, 291-293 (Mar.-Apr. 1972)</p> <p>Earlier work has indicated that pesticide residues are deposited into chicken tissues, but little information is available on the fate of the residues during cooking and heating of foods. The present article reports on the effects of cooking and heating on the lindane, endrin, heptachlor, dieldrin, and aldrin present in chicken tissue.</p> <p>Lindane, endrin, heptachlor, dieldrin, and aldrin were fed at 10 p.p.m. to separate groups of broilers throughout an 8-week growing period. Each group consisted of 30 chicks. The groups were fed the same rations except for the pesticide added to the feed. After the test feeding period, tissues from these birds were cooked by baking, frying, or steaming, and were heated (350° F. in closed containers for 30, 60, and 90 min.</p> <p>The pesticide residues (calculated on the dry matter basis) were lowered in the tissues during cooking but the amount of the reduction was not significant in most cases. The level of lindane was reduced considerably when the tissues were heated in closed containers. Heptachlor epoxide concentration in the tissues was lowered during heating, but the concentrations of endrin, dieldrin, and aldrin were not lowered. Apparently, the losses of these pesticide residues occurred primarily by leaching with fat and water (but there was some destruction of lindane and heptachlor epoxide by heating).</p> <p>FTP [3 tables, 11 references]</p>	<p>0.5</p> <p>AUTOTROPHIC AND HETEROTROPHIC NITRIFICATION IN AQUATIC SYSTEMS [LA NITRIFICATION AUTOTROPHE ET HÉTÉROTROPHE DANS LES ÉCOSYSTÈMES AQUATIQUES]</p> <p>Laurent, M. (Station d'Hydrobiologie, I.N.R.A., 64-Biarritz, France) Annales de l'Institut Pasteur 121, No. 6, 795-810 (Dec. 1971) (In French; summary in English) (Masson et Cie Éditeurs 120, Boulevard Saint-Germain, Paris-VI, France)</p> <p>This paper reports on studies that help elucidate some of the steps involved in the nitrification process in water and in mud. The author concludes that, under aquatic conditions (that is in rivers, ponds, and lakes), nitrification from ammonia occurs naturally in mud through the action of autotrophic and heterotrophic bacteria growing in micro-aerophilic conditions or by the sole action of heterotrophes in anaerobic conditions. Presumably, in the presence of strongly reducing muds nitrification is absent.</p> <p>[5 figures, 5 tables, 30 references]</p> <p>FTP</p>
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<p>0.9</p> <p>EVALUATION OF METHODOLOGY IN THE UNIVERSITY OF MICHIGAN'S SEA GRANT DELPHI INQUIRY</p> <p>Ludlow, John D. (University of Michigan Sea Grant Program, Ann Arbor, Mich.) Sea Grant Technical Report No. 22, (MICHU-SG-72-202), 90 pp. (Feb. 1972) (University of Michigan Sea Grant Program, Ann Arbor, Mich.)</p> <p>The author evaluates the effectiveness of the Delphi techniques in solving two related management problems: (1) integrating the judgments of an interdisciplinary research team, and (2) conveying its informed insights to regional decision makers. [12 tables, 48 references, 2 appendices]</p> <p>FTP</p>	<p>0.8 (9.19)</p> <p>RENEWING THE SOIL</p> <p>Meyer, Judith G. Environment <u>14</u>, No. 2, 22-24, 29-32 (Mar. 1972)</p> <p>Compost systems are valuable and possibly essential in the long run but they cost more than the compost is worth. Presently, more economical alternatives to composting are imposing increasing problems of pollution and depletion of natural resources. The author suggests that the realization of the long-term potential of composting requires that individuals, agricultural and industrial concerns, and all levels of government agencies cooperate in the production and utilization of compost. [1 figure, 3 tables, 17 references]</p> <p>FTP</p>
	<p>WORLD FOOD AND POPULATION PROBLEMS: SOME POSSIBLE SOLUTIONS</p> <p>(9.2)</p> <p>Kharbas, S. S., and D. K. Salunkhe (Utah State University, Logan, UT 84321) Food Technology <u>26</u>, No. 4, 148-150, 152, 154, 156-159 (Apr. 1972)</p> <p>In this article the authors discuss the present sources of food, the amount of food produced, and the difficulties and possibilities of increasing the world food supply with the resources at our disposal. They suggest some ways to help solve the world's food and population problems: (1) Food production could be increased by using our resources properly. This means intensive cultivation of our presently cultivated areas, including the use of irrigation. (2) Crop yields could be increased through the use of fertilizer, by the development of improved varieties of plants, and through the use of chemicals to protect crops. (3) Better use of ocean resources could be achieved by use of certain species of fish for food rather than industrial purposes, by use of fish protein concentrate, and by use of aquatic plant products for human and animal foods. (4) Food supplies could be increased by the development and production of synthetic foods from coal, natural gas, wood, or petroleum. (5) Losses of food could be prevented by application of proper preservation methods and through the control of rats and insects. (6) The use of proper packaging, and storage and transportation facilities would help prevent spoilage and waste. (7) Social and economic obstacles could be adjusted so to encourage the use of modern technology in the production and distribution of food. (8) Education and training of the labor force would aid in the application of modern food technology. (9) Control of population growth would aid in the successful implementation of programs for economic growth. (10) Assistance to developing nations in the transfer of technology and interest in attaining self-sufficiency will help increase food production.</p> <p>[7 figures, 6 tables, 22 references]</p> <p>FTP</p>



0.9 (9.2)  
Hazelton, Jared E. (Department of Economics, College of Social and Behavioral Sciences, University of Texas, Austin, TX 78712)  
Technological Forecasting and Social Change 3, No. 3, 353-366 (1972)

Technology is responsive to economic and social pressures. These pressures often materialize as political decisions that affect progress. Technological forecasting, therefore, must consider that future socioeconomic conditions will require the creation of new technological capabilities. The authors purpose in this paper was to examine one particular type of socioeconomic change, the increasing public awareness and concern over deterioration of the natural environment, and to analyze the implications of this change for the direction and pace of future technology.

If present trends in population and economic growth continue for the next 30 years, continued conflicts between man's economic activities and the state of the natural environment will occur. These conflicts will lead to continued political pressures for protection of the environment. The course taken, then, by public policies implementing environmental controls will affect not only the future direction of technology, but will also influence an individual firm's opportunities for profitable growth and development.

In this paper, the author presents an analytical framework for viewing the conflict between man's economic activities and his natural environment. He then considers the problems of resource scarcity, recycling of wastes, and pollution control. [4 figures, 1 table, 21 references]

1.0154 JAPANESE DISTANT-WATER FISHERIES: A REVIEW  
Kasahara, Hiroshi (College of Fisheries, University of Washington, Seattle, WA 98195)  
Fishery Bulletin 70, No. 2, 227-282 (Apr. 1972)

Most of the industrialized fisheries of Japan have developed under a licensing system controlled by the central government. Limitations on entry and the allocation of resources based on a variety of social and economic considerations have resulted in the development of an extremely diversified industry.

The postwar expansion of distant-water fisheries greatly accelerated the exploitation of resources in the North Pacific, as well as in many other areas of the world, and has caused numerous international conflicts. In addition to regional conventions for high seas fisheries, various bilateral agreements have been negotiated to cope with problems arising from jurisdictional claims by coastal states. While supporting narrow limits of national jurisdiction and the concept of free access to high seas fishing, Japan has accepted different forms of allocation as a means to accommodate the conflicting interests of the nations involved. Her domestic institutions and organization of the industry have helped the government make pragmatic arrangements with other nations. Whether or not a general agreement on fishery issues can be reached at the new Law of the Sea Conference, Japan will face more and harder international negotiation zones of national jurisdiction.

Each of the main sectors of the Japanese fishing industry, including inshore fisheries, offshore fisheries, distant-water fisheries, and aquaculture, now operates under severe constraints. Although the total catch of distant-water fisheries is still increasing due largely to intensified pollack fishing in the Pacific, (over)

2.03 COMPARATIVE STUDY OF THE MUSCLE CATHEPTIC ACTIVITY OF SOME MARINE SPECIES

Wojtowicz, M. B., and P. H. Odense (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 29, No. 1, 85-90 (Jan. 1972)

[Cathepsins are proteolytic enzymes occurring at high concentrations in tissues of organs such as kidney, liver, and spleen. They are present in lesser amounts in tissues or other organs including brain, muscle, and erythrocytes.] Catheptic activity is suspected of being responsible for many autolytic changes in fish during storage and processing but the relationship is not clear.

Muscle tissue of some commercially important fish and shellfish were tested for total catheptic activities, which included hemoglobin-splitting activity and endogenous protein-splitting activity. This proteolysis was measured as an increase of "tyrosine-like products."

Samples were taken from white dorsal skeletal muscle of fish kept alive until required. Samples of claw muscle from live crabs and lobsters, and tail muscle from the latter were also taken.

A homogenate of 1 part muscle blended with 10 parts 1% NaCl was prepared and used within 2 to 4 min. An extract was prepared by blending 1 part muscle with 5 parts 1% NaCl. The resultant slurry was frozen overnight, thawed in cold water, and centrifuged at 10,000 g for 20 min. The clear supernatant was used as the muscle extract.

Hemoglobin-splitting activity was determined by incubating at 35° C. 4 volumes of a 1.5% hemoglobin solution in 0.1 M acetate buffer (adjusted to the desired pH), with 1 volume of muscle extract. During incubation samples of the mixture were removed at intervals of 30 and 60 min. Enzymatic activity was

1.0118 SURVIVAL OF SOME FRESHWATER FISHES IN THE ALKALINE EUTROPHIC WATERS OF NEBRASKA

McCarraher, D. B. (Nebraska Game and Parks Commission Office of Limnology, Hastings College, Hastings, NE 68901)  
Journal of the Fisheries Research Board of Canada 28, No. 11, 1811-1814 (Nov. 1971)

Survival of 14 species of fish in waters containing minerals causing varying alkalinities was investigated. Sacramento perch (*Archoplites interruptus*), fathead minnow (*Pimephales promelas*), northern pike (*Esox lucius*), and black bullhead (*Ictalurus melas*) were most tolerant of alkalinities (as Na<sub>2</sub>CO<sub>3</sub> and KCO<sub>3</sub>) above 300 mg. per liter. A classification index is included that describes lakes which range from slightly to strongly alkaline with suggested fish species for each class. [2 tables, 10 references]

SW

In this article the authors consider the motion characteristics of the small typical fishing boat (KIST-MRC fishing boat) with transom stern in regular head sea.

2.115 A NOTE ON THE STRIP METHODS ASSOCIATED WITH SHIP MOTION PROBLEMS  
Kwon, Y. J., and J. H. Hwang  
J. Soc. Naval Archit. Kor. 8, No. 1, 17-28 (1971)  
Korean Scientific Abstracts 3, No. 6, Item (71/615), 179 (Dec. 1971)

2.1121

## MAKING AND MENDING NETS.

## PART SIX: FITTING THE FLOPPER, CHAFERS, FOOTROPE AND COD-LINE

Buckingham, Harry  
World Fishing 21, No. 3, 57-58 (Mar. 1972)

The final stages of braiding and equipping a small boat trawl are described.  
[2 figures]

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2.1121

THEORETICAL STUDIES ON THE MECHANICAL CHARACTERISTICS  
OF TWO-SEAM TRAWL NET

Nakasai, Kei, and Efren Ed. C. Flores  
Bulletin of the Faculty of Fisheries Nagasaki University No. 32, 113-128 (Dec. 1971)

A model two-seam trawl net was constructed and tested in a tank of circulating water.  
[19 figures, 6 references]

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[4 figures, 5 references]

Models of a two-seam trawl net and a four-seam trawl net of the same size were built and tested in a tank of circulating water. The four-seam trawl seemed to be more efficient than the two-seam trawl.

Flores, Efren Ed. C., and Kei Nakasai  
Bulletin of the Faculty of Fisheries Nagasaki University No. 32, 129-134 (Dec. 1971)

ON THE COMPARISON BETWEEN TWO-SEAM TRAWL NET AND  
FOUR-SEAM TRAWL NET

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stopped in the samples by addition of 10% trichloroacetic acid (TCA) in 2.4 M urea. Blanks were prepared by adding TCA to the hemoglobin solution and immediately adding muscle extract without incubation. The treated samples from the incubated mixture were filtered and the filtrate was tested for tyrosinellike products as follows: Folin's phenol reagent was added, followed by a comparison of the resultant absorbation at 690 mμ with the standard tyrosine curve.

Autolytic activity was determined by incubating (at 35° C.) the muscle homogenate with an equal volume of 0.2 M glycine-HCl buffer adjusted to pH 3.5. Samples were taken during incubation at 60-min. intervals and treated with TCA. Total nitrogen was determined by the semimicro Kjeldahl method; protein nitrogen was calculated from the results.

The optimum pH for hemoglobin-splitting activity was 3.2 to 3.4 for muscle from all fish species. Activity markedly fell off below pH 3.0 or above pH 3.6. There was not a great variation in total protein of homogenate from white muscle of all fish species. Protein concentration in muscle extracts varied from 21 to 45% of total tissue protein but the catheptic activity in the extracts represented 42 to 85% of total tissue activity, about a twofold increase in specific activity over the total activity in the homogenates.

Of the species studied, cod (*Gadus morhua*) muscle showed high hemoglobin-splitting activity and hake (*Urophycis tenuis*) muscle showed low activity. Lobster (*Homarus americanus*) and crab (*Opilio chionoecetes*) claw muscles were higher in hemoglobin-splitting activity than was the muscle of any other fish studied.

These findings, the authors suggest, indicate that the high levels of catheptic activity are not responsible for rapid autolytic changes that occur in fresh fish. And further, hemoglobin-splitting activity of cathepsins is greater than the autolytic activity in the same fish species.

[2 figures, 4 tables, 22 references]

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long-term prospects for further expansion do not appear bright. Little progress has been made in the utilization of abundant resources of unconventional species. Thus, the rapid growth of domestic fishery production is unlikely to continue. Increased joint ventures and other business arrangements in foreign countries may provide a partial solution. Import decontrol for fishery products would contribute substantially to meeting immediate problems of supply shortage.

Author's abstract

[18 figures, 6 tables, 27 references]

This report is an aid to public relations and promotion of Oklahoma's fishing program. The history, productivity, and problems of the commercial fishery are summarized. A general plan for promoting the fishery is provided with the output needs from involved agencies. (Author)

Reprinted

Mensing, Gary C.  
Completion Report, Feb. 1-May 31, 1971, Project 2-140-R, 7 pp. (June 1971). Oklahoma Department of Wildlife Conservation, Oklahoma City, Okla. Available National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10060.

1.0118  
(9.2) PLANNING FOR THE DEVELOPMENT OF THE COMMERCIAL FISHERY  
IN OKLAHOMA

SCIENCE OF SIGNIFICANCE THE

60

(66120 021 Cambridge, MA (1972)  
Weisskopf, Victor F. Massachusetts Institute of Technology, Cambridge, MA (1972)

The author discusses the role of science in human affairs. He concludes the article by stating that all aspects and parts of science belong together. For science to be developed for the sake of pure knowledge and insight. But science will not survive unless it is used intensely and wisely for the betterment of humanity and not as an instrument of domination over another. Compassion and curiosity are two powerful elements in human existence; curiosity without compassion is inhuman and compassion without curiosity is ineffectual.

[9 references]

This report lists 5 bibliographies and about 326 references to articles and reports on "noise pollution" and control.

FTP

Anonymous  
Record of the Association of the Bar of the City of New York 27, No. 2, 118-132 (Feb. 1972)

SELECTED MATERIALS ON THE PROBLEM OF "NOISE POLLUTION"  
AND CONTROL

0.9  
(9.19)



2.143 THE USE OF ELECTRICITY IN CONJUNCTION WITH A 12.5-METER (HEADROPE) GULF-OF-MEXICO SHRIMP TRAWL IN LAKE MICHIGAN

Ellis, James E. (Fish Farm Experiment Station, National Marine Fisheries Service, Kelso, AK 71666)  
NOAA Technical Report NMFS SSRF-653, iv + 10 pp. (Mar. 1972) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20420. Price \$0.25.

The catching efficiency of a 12.5-meter standard shrimp trawl and the same trawl fitted with three different electrode array systems with power on and power off was investigated. The standard trawl caught 1.54 times or 54.2% more kilograms of fish than the electrode-equipped trawl with power off. The electrode array hanging across the mouth area of the trawl acted as a visual stimulant and thus reduced the trawl's catch rate. Overall the electrical trawl with power on caught 1.19 times or 19.0% more kilograms of fish than the electrical trawl with power off. Array 2 with power on had the best catch rate--1.86 times or 86.9% more kilograms of fish than the power off catch rate. The avoidance of fish to an electrode array was more than offset with the catch rate of array 2 with power on. The dominance patterns of the catches with each system tested did not change significantly with the exception of chub catches with array 2 with power on. Length selectivity was highly significant for chubs caught with arrays 2 and 3 with power on. No significant length selectivity occurred with the other species landed. [11 figures, 4 tables, 5 references] Author's abstract

2.3 TEXTURAL CHANGES IN PRECOOKED LOBSTER (HOMARUS AMERICANUS) MEAT DURING REFRIGERATED STORAGE, FREEZING AND FROZEN STORAGE

Dagbjartsson, Bjorn, and Myron Solberg (Rutgers University, New Brunswick, NJ Journal of Food Science 37, No. 2, 185-188 (Mar.-Apr. 1972)

This paper reports on laboratory studies that were designed to determine (1) the effects on the texture of lobster meat of cooking time and (2) the degree of change in texture as a function of time in precooked lobster meat during refrigerated storage, freezing, and frozen storage (at  $-12 \pm 2^\circ \text{C}$ . and at  $-27 \pm 1^\circ \text{C}$ .). The texture of the lobster meat was evaluated by the chew count (sensory) method of G. Harrington and A. M. Pearson [J. Food Sci. 27, 106 (1962)] and A. S. Szczesniak, M. A. Brandt, and H. H. Friedmann [J. Food Sci. 28, 397 (1963)], with some modification. The Warner-Bratzler shear was used for the objective measurement of texture.

Lobster meat (tails) cooked for 10, 20, and 30 min. showed no significant difference in texture. The texture of the precooked lobster meat did not change significantly when the precooked meat was stored at  $3 \pm 1^\circ \text{C}$ . for 2 weeks. Also, freezing (air-blast freezer was used--the temperature of the meat reached  $-40^\circ \text{C}$ . after 5 hr.) and thawing (the frozen samples were held overnight at  $5^\circ \text{C}$ ., then for 2 hr. at room temperature) the precooked lobster meat had no significant effect on the texture of the meat. When the precooked lobster meat was frozen and held in storage at  $-12 \pm 2^\circ \text{C}$ . the changes in texture of the meat were significant after it had been stored for 3 to 4 months, but when the meat was stored at  $-27 \pm 1^\circ \text{C}$ . significant changes in texture did not occur until after 9 to 10 months of storage. [2 figures, 5 tables, 18 references] FTP

2.9 INTERACTION BETWEEN PARALYTIC SHELLFISH POISON AND MELANIN OBTAINED FROM BUTTER CLAM (SAXIDOMUS GIGANTEUS) AND SYNTHETIC MELANIN

Price, R. J., and J. S. Lee (Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331)  
Journal of the Fisheries Research Board of Canada 28, No. 11, 1789-1792 (Nov. 1971)

Paralytic shellfish poison (PSP) distribution pattern in butter clam siphon (where major amount of PSP accumulates) appears to correspond to the areas of melanin pigmentation. The interaction of melanin and PSP was examined. A melanin preparation from clam siphon and a synthetic melanin were incubated with a purified, standardized PSP preparation. The release of bound PSP was measured after the residue resulting from centrifugation was suspended in buffers of varying pH. The binding increased with increasing pH. In clam melanin, binding to PSP increased from zero at pH 2.0 to a maximum of 63% at pH 6.0. In synthetic melanin, binding to PSP was 100% at pH 5.0 and near 100% between pH 4.0 and pH 8.0. The difference in binding is attributed to a less organized structure in synthetic melanin with greater exposure of reactive sites than in clam melanin.

The reversible nature of the PSP-melanin binding was shown by desorption of increasing amounts of PSP as pH was decreased. This interaction followed a similar pattern reported between PSP and a cation exchanger. [3 figures, 12 references] SW

3.249 FATTY ACIDS OF CHANNEL CATFISH (ICTALURUS PUNCTATUS) (8.8)

Worthington, R. E., T. S. Boggess, Jr., and E. K. Heaton (Department of Food Science, University of Georgia College of Agriculture Experiment Stations, Georgia Station, Experiment, GA 30212)  
Journal of the Fisheries Research Board of Canada 29, No. 1, 113-115 (Jan. 1972)

As part of a study relating fish culture, processing, and storage practices to composition and product quality, identification of principal fatty acids in lipids of commercial catfish was determined.

Freshly processed, pond raised catfish (eight fish from each of five processing locations) were frozen until tissue samples could be taken for analysis. Duplicate fatty acid methyl ester determinations were made on muscle taken from back, side, and belly flap of each fish, and combined and dried by lyophilization. Methyl esters were analyzed in a gas chromatograph with dual flame ionization detectors. Peaks were identified by comparing with standard retention times.

Of total fatty acids found in sufficient quantity for measurement 23 varied in concentration from 0.1% (22:2 and 24:0) to 42.4% (18:1). The saturated fatty acids comprised 26.5% of the total. Of the unsaturated fatty acids monoenes comprised 48.1%; dienes 13%; trienes 3.1%; and tetraenes 3.6% of total fatty acids. Variations in fatty acids in fish lipids was significant except 20:3, and variation associated with process location was observed.

The authors suggest that variation in fatty acid composition of fish lipids is due to differences in feeds and naturally occurring diverse foods in pond culture. The high value determined for linoleic acid might be expected to contribute (over)





Fan, T. Y., and S. R. Tannenbaum (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Journal of Food Science 37, No. 2, 274-276 (Mar.-Apr. 1972)

The stability of four, differently structured N-nitroso compounds was determined in model systems at a temperature of 110° C. over the pH range of from 2 to 12.5 and in reaction media of different chemical composition. The four nitroso compounds studied, representing four different structural characteristics, were N-nitrosopyrrolidine (a heterocyclic nitrosamine); N-nitrososarcosine (a simple dialkyl nitrosamine with a carboxylic substitute on the carbon  $\alpha$  to the amino group); N-nitrosoproline (has a cyclic structure and a carboxylic group); and dimethylnitrosamine (has neither a cyclic structure nor a carboxylic group).

In general, the four compounds were stable to the heat treatment (110° C.). At pH 6.5 to 8.5, nitrosoproline has a half-life longer than 5 days at 110° C. The average half-life at 110° C. for the four nitrosamines was 21 days. The introduction of a carboxylic group weakens the stability of the nitrosamines at acidic pH values. The cyclic nitrosamines were less stable than were the noncyclic nitrosamines at alkaline pH. The nitrosamines appear relatively unreactive toward certain food components (glucose, ascorbic acid, cysteine, protein, nucleic acid) and thus could survive thermal food processes.

[3 figures, 1 table, 12 references]

FTP

### 3.6 (0.6) PRELIMINARY STUDIES ON SOME PROPERTIES OF INTERMEDIATE MOISTURE, DEEP-FRIED FISH FLESH

Collins, J. L., C. C. Chen, J. R. Park, J. O. Mundt, I. E. McCarthy, and M. R. Johnston (Department of Food Technology, University of Tennessee, Knoxville, TN 37901)  
Journal of Food Science 37, No. 2, 189-190 (Mar.-Apr. 1972)

An intermediate moisture food (IMF) is one that has sufficient moisture removed from it so that it is shelf stable (without refrigeration or without having been thermally processed), but is sufficiently moist to be eaten without rehydration. In this study, fillets of cod and of ocean catfish were used in the preparation of IMF fish flesh. The fillets were infused with a solution of glycerol, propylene glycol, NaCl, and potassium sorbate. They were then drained and coated with a batter of bread crumbs and wheat flour. The breaded pieces were deep-fat fried for 3 min. at 171° C. For storage studies, samples were placed in glass jars, and the jars were sealed and held at 26.7° C. for up to 5 weeks. The IMF cod and ocean catfish samples were examined for content of crude lipids, NaCl, moisture, and glycerol, and for pH, water activity value, and iodine value. The IMF ocean catfish product was also examined for total aerobic plate count and mold count, and for presence of *Staphylococcus* sp.

The initial  $A_w$  for the IMF catfish product was 0.845 and for the IMF cod product was 0.828. There was no significant change in the  $A_w$  of these products after 5 weeks of storage at 26.7° C., but there was a decrease in moisture content, in pH, and in the iodine values. Except for one sample, the IMF the ocean catfish product showed no detectable bacteria, mold, or *Staphylococcus* sp. The one exception had,

### EFFECTS OF ADAPTIVE AND NONADAPTIVE FEEDING OF HYDROGENATED AND RAW HERRING OIL ON HEARTS AND LIVERS OF WEANLING RATS

Odense, P. H., and H. Brockerhoff (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 28, No. 11, 1793-1795 (Nov. 1971)

Since monounsaturated fatty acids (C20 and C22) are reported to have led to cardiac lesions in weanling rats, fish oils containing these fatty acids may be implicated. To investigate the possibility, groups of weanling rats were fed a ration containing either 18% hydrogenated herring oil or 18% raw herring oil for 24 days. Two other groups of weanling rats were gradually adapted to these rations during an initial 12-day period and continued for a total of 24 days also. A control group was fed a ration containing lard and corn oil. Histological examination of heart tissue failed to show any evidence of unusual fat deposition or muscle damage in any of the groups of rats. Histological examination of livers failed to indicate any difference between the control group and the groups fed herring oils. [1 figure, 7 references]

SW

Bour, H.  
Annls Hyg. Langue fr. 7, No. 3, 15-23 (1971) (In French)  
BEMIRA Abstracts 25, No. 2, Abstract No. 459, 97 (Feb. 1972)

### 4.9 METABOLISM AND UTILIZATION OF FATS IN MAN

### STEROLS OF SOME CHESAPEAKE BAY ALGAE

(4.19)

6.32

Doyle, P. J., and G. W. Patterson (Department of Botany, University of Maryland, College Park, MD 20740)  
Comparative Biochemistry and Physiology 41, No. 2B, 355-358 (Feb. 15, 1972)

The principal sterol of seven species of red algae was cholesterol. The principal sterol of three species of green algae was 28-isofucosterol, with lesser amounts of cholesterol and 24-methylene cholesterol.

[1 table, 16 references]

FTD

*Laminaria hyperborea* is one of the most important commercial seaweeds in Scotland and other parts of the northeastern Atlantic. In Norway and Britain, it is used for the manufacture of alginates. Common names for this seaweed are: Norway-Trollare; British Isles-Tangle; Germany-Palmentang; and France-Tail-penn. [16 figures, 11 tables, 236 references]

FTF

### 6.31 SYNOPSIS OF BIOLOGICAL DATA ON LAMINARIA HYPERBOREA

Kain, Joanna M. (Marine Biological Station, Port Erin, Isle of Man, United Kingdom)

FAO Fisheries Synopsis No. 87 (FIRM/S87), 65 pp. (Dec. 1971) Food and Agricultural Organization of the United Nations, Rome, Italy (Distribution Restricted)

Nakazono, S. (pat.)  
Japanese Patent 33699/71  
Food Technology 26, No. 2, 60 (Feb. 1972)

Fish (or meat) byproducts are heated in oil. The solid material is removed from the oil and then it is finely divided.

species as to the loss of mercury during cooking.  
figure 10 tables 50 references! FFP

This paper reports on the effect of steam cooking on the mercury content of three species of tuna (bigeye, yellowfin, albacore). Data also are presented on the comparative effect of steam cooking and cooking in water and in brine (NaCl) on the mercury content of bigeye tuna. During the cooking phase, the mercury loss

3.63	PRESERVATION OF FOODSTUFFS
13	INFLUENCE OF PROCESSING ON THE MERCURY CONTENT IN PRESERVED TUNA FISH

BRITISH MEDICAL JOURNAL 1, 721, 55/  
BFMIRA Abstracts 24, No. 12, Abstract No. 4194, 851 (Dec. 1971)

The foodstuff is freeze dried to a moisture content of below 20% by weight in the case of meat and less than 7% in the case of vegetables. The dehydrated foodstuff is then infused with water-soluble solutes to raise the moisture content to 15-44%.

amount greater than 5% by weight of the foodstuff. Reprinted

3.63 FOODSTUFF COMPOSITION

General Foods Corp. (U.S.A.)  
British Patent 1,251,358  
BFMIRA Abstracts 24, No. 12, Abstract No. 4195, 851 (Dec. 1971)

The patent relates to the manufacture of intermediate moisture foods and the

Authors conclude that fish flesh has the potential for preparation into intermediate moisture foods.  
3 tables, 18 references]

6 (0.6)



6.54  
(2.06)

STABILITY OF FISH SAUSAGE AT LOW TEMPERATURE STORAGE

Hing, Francisco S., Nora Yu-ang Tang, and Catherine G. Cavalletto (Department of Food Science and Technology, University of Hawaii, Honolulu, HI 96822)  
Journal of Food Science 37, No. 2, 191-194 (Mar.-Apr. 1972)

Fish sausages consist of ground fish, fat, starch, seasonings, and curing agents. They are packed in plastic casings and processed at 83° to 90° C. for from 40 to 60 min. Fish sausages are perishable; in Japan nitrofurans chemicals are used to help preserve the product (These preservatives are not permitted in the United States.). The purpose of the present study was to determine the stability of a prepared fish sausage stored at 0°, 35°, and 45° F. The formulation of the fish sausage was as follows (all values expressed in grams): Fish meat (45% skipjack tuna and 55% striped marlin)--1,000; ice water--200; vegetable shortening--100; corn starch--80; salt--25; sugar--7; monosodium glutamate--3; spices--5.50 (The spices consisted of white pepper--2, onion powder--1, ginger powder--1, nutmeg powder--1, and garlic powder--5); ascorbic acid--0.05; and sodium nitrite--0.01. The sausages were heated in water (207°±3° F.) in a steam-jacketed kettle; the heating was terminated 30 min. after the sausages reached an internal temperature of 180° F. The cooked sausages were cooled in ice water to an internal temperature of 70° F. The cooked and cooled sausages were immersed in boiling water for 1 min. to shrink the casing. The sausage samples were stored at 0°, 35°, and 45° F., then examined at periodic intervals of storage. The fish sausage was of good quality as judged by sensory evaluations. The initial bacterial count of the fish sausage, and the counts throughout the 26-week (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 11

6.54  
(2.06)

SOME FACTORS INFLUENCING THE PRODUCTION OF PROTEIN ISOLATES FROM WHOLE FISH

Meinke, Wilmon W., Muhammad A. Rahman, and Karl F. Mattil (Texas Engineering Experiment Station, Texas A&M University, College Station, TX 77843)  
Journal of Food Science 37, No. 2, 195-198 (Mar.-Apr. 1972)

Four general basic steps are involved in the preparation of protein isolates from fish: (1) the proteins are dissolved in an aqueous medium through the proper adjustment of the pH and by use of certain salts, (2) the undissolved residue (bones, scales) are removed, (3) the protein is recovered from the solution by the adjustment of pH or by dilution, and (4) the recovered protein is purified and dried. The present paper reports some preliminary laboratory data on some factors that relate to production of fish protein isolates, particularly those factors dealing with the solubilization of the protein and the recovery of the protein from solution. Golden croaker, mullet, and carp were used in these tests. The factors considered were: the solubility of the protein of different fishes at different pH values; the solubility of the protein of previously frozen fish at different pH values; the effect of NaCl on the solubility of the fish protein; the effect of ratio of fish to extracting medium on the solubility of the protein; and the effect of temperature on the extraction of protein from the fish.

The data indicate about 45% to 55% recovery of the protein from the fish as a protein isolate by extraction at pH 3 or pH 11 and precipitation of the protein from the extract at pH 5-6. Frozen fish may produce a lower yield of protein isolate than fresh fish may produce. The amount of protein dissolved at 22° C. is independent of the fish solids up to 40 g. per 100 ml. of extractant; however, the actual volume of extract that is recoverable decreases with increased (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 11

7.591  
(0.38)

ESR PROBING OF MACROMOLECULES: SPIN-LABELING OF THE ACTIVE SITES OF THE PROTEOLYTIC SERINE ENZYMES

Hsia, J. C., D. J. Kosman, and L. H. Plette (Biophysics Laboratory, Department of Biochemistry and Biophysics, School of Medicine, University of Hawaii, Honolulu, Hawaii 96822)  
Archives of Biochemistry & Biophysics 149, No. 2, 441-451 (Apr. 1972)

[Spin is a term used in nuclear physics to describe the angular momentum of particles and nuclei. Spin is detected by plotting the spectrum that is produced when a sample of material absorbs electromagnetic radiation at the appropriate frequency. This nuclear magnetic resonance spectrum plot is used to elucidate and identify molecular structure and to detect changes in molecular environment. A molecular structure so identified is called spin-labeled.]

The results of the present experiments indicate that spin-labeled fluorophosphonates react with serine proteinases and esterases in a manner analogous to the common active phosphate ester inhibitors. The reporter group properties of the spin-labeled inhibitors made possible a comparative study of the microstructure of the active sites of these enzymes as well as determinations of rates of inhibition. The effect of various environmental perturbations on the conformation of these active sites has also been probed.

[8 figures, 1 table, 31 references]

SW

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 11

7.591  
(8.59)

COMPARATIVE STUDIES OF FISH ADENOSINE DEAMINASES

Ma, Pang F. (Department of Chemistry, Ball State University, Muncie, IN 47306), James R. Fisher (Department of Chemistry and Institute of Molecular Biophysics, Florida State University, Tallahassee, FL 32306)  
Comparative Biochemistry and Physiology 41, No. 3B, 469-474 (Mar. 15, 1972)

The study determined the kinds of adenosine deaminases in fish livers and compared them with those in terrestrial vertebrates. Fish livers exhibit all the patterns of adenosine deaminases that have been found in terrestrial vertebrates and about in the same proportion.

[4 figures, 1 table, 7 references]

SW

7.591  
(0.38)

NUCLEOTIDE PYROPHOSPHATASES. PURIFICATION AND PROPERTIES OF AN ENZYME FROM LIVERS OF FRESH WATER FISHES (MALLICO ATTU)

Krishnan, N., and N. Appaji Rao (Dep. Biochem., Indian Inst. Sci., Bangalore, India)  
Chemical Abstracts 76, No. 9, 43269f (Feb. 28, 1972)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 7 PAGE 11





7.8 COMPARISON OF METHODS OF ESTIMATING THE NUMBER OF *ESCHERICHIA COLI* IN EDIBLE MUSSELS AND THE RELATIONSHIP BETWEEN THE PRESENCE OF *SALMONELLAE* AND *E. COLI*

Thomas, K. L., and Armorel M. Jones (Public Health Laboratory, Conway, North Wales, United Kingdom)  
Journal of Applied Bacteriology 34, No. 4, 717-725 (Dec. 1971)

The authors tested four methods of assessing the bacteriological quality of mussels. The method of the Fishmongers' Company [F. A. Knott, "Memorandum on the Principles and Standards Employed by the Worshipful Company of Fishmongers in the Bacteriological Control of Shellfish in the London Markets," London: Fishmongers' Company (1951)] was the most useful from the public health aspect where facilities are limited. A modification of the method of L. F. L. Clegg and H. P. Sherwood by N. Reynolds and P. C. Wood [J. Appl. Bact. 19, 20 (1956)] was more sensitive and more simple to perform and is recommended for routine use. The authors suggest that two *E. coli* cells/ml. of mussel tissue is probably the upper acceptable limit for satisfactory grading of mussels. Further, the presence of small numbers of salmonellae in purified mussels may not be highly significant. FTP [4 tables, 10 references]

7.86 INDUSTRIAL ADVANTAGES OF FA TESTING FOR *SALMONELLAE*

Insalata, Nino F., W. Gail Dunlap, and Cy W. Mahne (General Foods Corporation, Post Division Research, 275 Cliff St., Battle Creek, MI 49016)  
Food Technology 26, No. 4, 124, 126 (Apr. 1972)

The method of testing for salmonellae in food published by the Association of Official Agricultural Chemists [Anonymous, JAOAC 50, 753 (1967)] is time consuming (5 to 7 days) and laborious. Food plants using this method must, therefore, maintain considerable storage space to hold the foods until the tests are completed. Furthermore, this storage inventory buildup may result in costly delays in shipping such products. The senior author, in a 2-year study, developed a rapid, direct fluorescent antibody (FA) method for the detection of salmonellae in foods and feeds [Bacteriol. Proc. p. 6 (1971)]. By use of this FA method, salmonellae can be detected in 24 to 32 hr. of elapsed time. Also, by the statistical use of combining and integrating samples, more samples can be examined than would be routinely possible. This new FA method will detect salmonellae in the range of  $1 \times 10^4$  cells per ml. of an elective enrichment broth. The FA technique may be used as a rapid screening tool and has been, in fact, used successfully in the continuous monitoring of raw materials, finished products, and environmental process samples. The authors indicate that the advantages of the FA method for the detection of salmonellae are: (1) It is more sensitive than the cultural method, (2) it has greater specificity through the use of a specific antiserum, (3) it offers increased statistical safety as a result of compositing and integrating samples (This makes possible the testing of a greater number of samples simultaneously.), and (4) the test time required for the FA method is about 32 hr. (5 days for the cultural method). [17 references] FTP

8.0 FATTY ACID CONTENT AND PROXIMATE ANALYSIS OF BAY, CALICO, SEA AND WEATHERVANE SCALLOP ADDUCTOR MUSCLE

Krzeczowski, Richard A., Richard D. Tenney, and Murray L. Hayes (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, P.O. Box 1638, Kodiak, AK 99615)  
Journal of Food Science 37, No. 2, 300-301 (Mar.-Apr. 1972)

This article contains data on the fatty acid content of and the proximate composition of the adductor muscle of bay, calico, sea, and weathervane scallops. The proximate composition of the raw adductor muscle of the scallops is shown in the following table:

Species of scallop	Composition of the raw adductor muscle			
	Moisture	Protein	Lipid	Ash
	%	%	%	%
Bay	82.9	14.4	0.7	1.6
Calico	82.1	15.4	1.0	1.7
Sea	80.4	17.1	0.9	1.7
Weathervane	80.9	16.6	1.1	1.5

For all the scallops tested, saturated fatty acids accounted for 24% to 30% of the total fatty acid content and monounsaturated fatty acids accounted for 24% to 30%. The polyunsaturated acid content of the total fatty acids from the (over)

8.8 FLAVOR EVALUATION OF VARIOUS MILK, VEGETABLE, AND MARINE PROTEIN SOURCES

Maga, J. A., and K. Lorenz (Department of Food Science and Nutrition, Colorado State University, Fort Collins, CO 80521)  
Journal of Milk and Food Technology 35, No. 3, 131-135 (Mar. 1972)

The purpose of this study was to compare certain sensory and chemical properties of eight currently available and representative samples of protein supplements. Sensory evaluations consisted of the examination of the samples by taste and smell for blandness of flavor and odor. Chemical evaluations involved testing for content of moisture, protein, fat, ash, and fiber and the determination of pH of the sample suspended in distilled and demineralized water. The composition of the protein supplements is listed in the table that follows. (over)

8.8

## BACTERIOLOGICAL EXAMINATION OF RAW BREADED FROZEN SHRIMP

Nickerson, J. T. R. (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139), and G. A. Pollak (Consumers Union of United States, Mount Vernon, NY 10550)  
Journal of Milk and Food Technology 35, No. 3, 167-169 (Mar. 1972)

Thirty-four lots of commercially prepared frozen, raw breaded shrimp were analyzed for total plate counts and were tested for enterococci, total coliforms, and *Escherichia coli*. The lots represent different commercial packers and the samples were picked up in various cities of the United States.

The plate counts for individual sample lots varied from 24,000 to 60,000,000 bacteria per gram (2 sample lots had counts between <50,000; 3 sample lots had counts between 50,000 to 100,000; 4 sample lots had counts between 100,000 and <500,000; 8 sample lots had counts between 500,000 and <1,000,000; 16 sample lots had counts between 1,000,000 and 6,200,000). The counts of enterococci (number per gram) ranged from 45 to 17,000 (3 sample lots had less than 100 enterococci per gram; 10 sample lots had between 100 to <500; 5 sample lots had between 500 and <1,000; 16 sample lots had between 1,000 and 42,000). The most probable number of coliforms (number per gram) ranged from <0.3 to 88.5 (11 sample lots had <0.3 to <5; 4 sample lots had between 5 and <10.0; 15 sample lots had between 10 and <50; 4 sample lots had 50 to 88.5). The most probable number of *E. coli* (number per gram) ranged from 0.1 to 8.3 (26 sample lots had between 0.1 and <1; 5 sample lots had between 1.0 and <2.0; 3 sample lots had between 2.0 and 8.3).

FTP

[1 table, 8 references]

7.8

DECREASE RATE OF C<sub>22</sub>:6 ACID AS AN INDEX TO OXIDATIVE DETERIORATION OF LIPIDS IN FISH PRODUCTS

Shono, Toshiniko, and Masamichi Toyomizu  
Science Bulletin of the Faculty of Agriculture Kyushu University 47, No. 3, 233-239 (Mar. 1972) (In Japanese; summary in English)

Peroxide values, carbonyl values, and 2-thiobarbituric acid values are commonly used as a measure of the deterioration of lipids in fishery products. However, the authors indicate, these tests are not always accurate indicators of oxidative deterioration because the tests are based on the analysis of unstable oxidative products. Furthermore, these unstable oxidative products may react with components of the fishery products. To evaluate the oxidative deterioration in the lipids of fish meal and lyophilized fish, the authors suggest the measurement of the peak area ratio of C<sub>22</sub>:6 to C<sub>16</sub>:0 acids on gas chromatograms and the calculation the rate of decrease of the C<sub>22</sub>:6 acid as follows:

$$\text{Rate of decrease of C}_{22}:6 \text{ acid (\%)} = 100 \left( \frac{0}{\frac{t_{C22}:6}{t_{C16}:0} - 1} - 1 \right)$$

The authors determined the rate of decrease of C<sub>22</sub>:6 acid, the peroxide values, and the 2-thiobarbituric acid values for the extracted lipids of a fish meal and of lyophilized fish muscle from jack mackerel (*Trachurus trachurus*) during the course of deterioration of the lipids in these products. They found that the rate of decrease of C<sub>22</sub>:6 acid was a better measure of the oxidative deterioration of the lipids of these products than were the peroxide values and the 2-thiobarbituric acid values.

[7 figures, 25 references]

FTP

8.8

Product	Moisture %	Protein %	Fat %	Ash %	Fiber %	pH
Nonfat dry milk (low heat)	3.2	35.7	1.0	8.1	--	6.79
Nonfat dry milk (high heat)	3.1	35.6	1.0	8.1	--	6.85
Whole milk powder	2.1	26.3	27.6	5.9	--	6.83
Whey powder	4.7	11.8	1.1	8.1	--	6.06
Deminerallized whey powder	4.0	35.2	3.1	2.8	--	6.65
Buttermilk powder	4.3	34.1	5.2	7.5	--	6.65
Sodium caseinate	3.6	90.3	1.1	3.9	--	6.96
Calcium caseinate	4.0	91.2	1.2	4.7	--	6.85
Isolated soy proteinate	4.9	92.0	0.4	3.9	0.2	7.04
Soy protein concentrate	7.8	65.1	0.4	4.7	2.9	6.92
Defatted soy flour (toasted)	6.3	52.8	1.0	6.0	2.4	6.82
Peanut flour	7.1	48.2	9.3	4.1	3.0	6.75
Fish protein concentrate	2.1	78.2	0.4	19.0	--	6.50
Cottonseed flour	9.6	54.5	2.4	6.9	3.2	6.61

Cottonseed flour powder had the most bland odor. Reconstituted low heat non-fat dry milk was rated the most bland in flavor and odor. Fish protein concentrate was rated the least bland of the products tested.

[6 figures, 1 table, 19 references]

FTP

Chemical Abstracts 76, No. 3, 12127d (Jan. 17, 1972)

Uskova, E. T., A. V. Chaikovskaya, and I. A. Uskov (Inst. Gidrobiol., Kiev, U.S.S.R.)

## AMINO ACID COMPOSITION OF FISH SKIN MUCIN

8.51

(16.7) 0.8

adductor muscle was 56.9% for the calico scallop, 58.3% for the bay scallop, 61.1% for the sea scallop, and 61.1% for the Weathervane scallop.  
[2 tables, 18 references]

FTP

## RADIONUCLIDES AND SELECTED TRACE ELEMENTS IN MARINE PROTEIN CONCENTRATES

8.9

(6.54)

Beasley, T. M.; T. A. Jokela; and R. J. Eagle (Coll. Fish., Univ. Washington, Seattle, Wash.)  
Chemical Abstracts 76, No. 7, 32974f (Feb. 14, 1972)

Reprinted

A table is given of the total count, coliform, enterococci and staphylococci counts of various types of fresh fish including herring, mackerel, cod, shellfish.

C.S.B.

Münzer, R.  
Arch. Lebensmittelhyg. 22, No. 10, 220-223 (1971) (In German)  
BFIIRA Abstracts 25, No. 1, Abstract No. 54, 11 (Jan. 1972)

ORIENTED INVESTIGATIONS INTO THE MICROBIOLOGICAL QUALITY OF FRESH FISH  
(0.5) (2.01)

7.85



Ogura, N. (Department of Chemistry, Tokyo Metropolitan University, Setagaya-ku, Tokyo, Japan)  
Marine Biology 13, No. 2, 89-93 (Mar. 1972)

This experiment on the decomposition of the dissolved organic matter (DOM) in the surface sea water was carried out under controlled laboratory conditions aboard ship in the north-equatorial Pacific. The dissolved organic carbon in the surface sea water decreased from 0.96 to 0.74 mg. of carbon per liter after the sea-water sample was incubated for 50 days in the dark at 25° C. The surface sea water seemed to contain two labile fractions of dissolved organic matter and one refractory fraction. The first labile fraction represents about 10% to 20% of the total dissolved organic matter and is utilized within 50 days. The second labile fraction represents 30% to 40% of the total dissolved organic matter. The refractory fraction is 50% to 60% of the total dissolved organic matter and it is not readily available to microorganisms. The author estimated that the rate of decomposition of the total dissolved organic matter was 0.0052 day<sup>-1</sup> and that for the first labile fraction was 0.033 day<sup>-1</sup>. The half-life for the total dissolved organic matter was estimated at 130 days and that for the first labile fraction. was estimated at 20 days. The author postulates that the two labile fractions, especially the first labile fraction, serve as food for microorganisms.

FTP

[2 figures, 4 tables, 29 references]

Blacker, R. W. (Fisheries Laboratory, Lowestoft, England)

FAO Fisheries Synopsis No. 84, v + 47 pp. (1971) (Distribution restricted) Food and Agriculture Organization of the United Nations, Rome, Italy

This is another of a series of documents issued by FAO, CSIRO, AND NMFS on species and stocks of aquatic organisms of present or potential commercial interest. The purpose of the documents is to provide fishery scientists with existing information in a standard format. [161 references]

Other synopses in this series issued since Jan. 1970 include: (1) National Marine Fisheries Service (Publications Distribution Unit, NOAA, U.S. Department of Commerce, Rockville, MD 20852)

BCF/S41, Chum salmon Oncorhynchus keta; NMFS/S79, Pacific Ocean perch Sebastes alutus; (2) FAO (Via delle Terme di Caracalla, 00100 Rome, Italy) (Distribution restricted) DFO/S4, rainbow prawn Parapenaeopsis sculptilis; DFO/S5, school prawn Metapenaeus macleayi; DFO/S6, greentail prawn M. bennettiae; DFO/S7, eastern king prawn Penaeus plebeius; DFO/S8, banana prawn P. merguensis; FIRM/S80 (Rev. 1) eel Anguilla anguilla; FIRM/S82, North Atlantic sandeels of the genus Ammodytes (A. tobianus, A. dubius, A. americanus, A. marinus); FIRM/S83, Saccorhiza polychaetes; FIRM/S38, knobbled wrack Ascophyllum nodosum; FIRM/S84, haddock Melanogrammus aeglefinus; (3) published in the Proceedings of the World Conference on the Biology and Culture of Shrimps and Prawns, Mexico City, Mexico, 12-21 June 1967 FIRM/S91, Crangon crangon; --S92, Pandalus montagu; --S93 jumbo tiger prawn Penaeus monodon; --S94, Indian prawn Penaeus indicus; --S95, prawn Pandalus platyceros; --S96, penaeid prawn Solenocera indica; --S97, penaeid prawn Metapenaeus

(over)

Sonstegard, R. A., and L. A. McDermott (Department of Microbiology, College of Biological Science, University of Guelph, Guelph, Ontario, Canada)  
Nature 237, No. 5350, 104-105 (May 12, 1972)

IPNV (infectious pancreatic necrosis virus) is a highly infectious virus of salmonid fishes and it has been isolated from almost every trout producing area of the world. The purpose of the present study was to find out whether free living warmblooded animals that have eaten IPNV-infected animals can transfer the infectious virus and can become actively infected with the agent. About 10<sup>8</sup>TCID<sub>50</sub> IPNV virus were inoculated into chicken, great horned owl, great blue heron, common eider, and American merganser. A virus suspension was introduced directly into the digestive tract using a syringe fitted with a piece of rubber tubing. Mink were inoculated with the virus by feeding them fish that had been injected with IPNV. Fecal samples were assayed for IPNV by the method of K. Wolf, M. C. Quimby, C. P. Carlson, and G. L. Bullock [J. Fish. Res. Board Canada 25, 383 (1968)]. The heron and the mink were killed 7 days after they were inoculated with IPNV and their spleen was examined for the virus by the method of G. H. Hoffman, S. F. Snieszko, and K. Wolf [U.S. Bureau Sport Fisheries and Wildlife, FDL-9 (1968)].

Infectious pancreatic necrosis virus was found in the feces of chicken, great horned owl, and mink but not in the feces of the American merganser, common eider, and great blue heron. IPNV was not detected in the spleen of the great blue heron and the mink.

(over)

Tinsley, I. J., and R. R. Lowry (Department of Agricultural Chemistry, Oregon State University, Corvallis, OR 97331)  
Lipids 7, No. 3, 182-185 (Mar. 1972)

Groups of male and female rats were fed rations modified as follows: supplemented with essential fatty acids (EFA) and with DDT; deficient in EFA, and no DDT; deficient in EFA, containing DDT; supplemented with EFA and no DDT. After 12 weeks the rats were analyzed for body weight, liver weight, and fatty acids in the liver lipids. The growth decline of female rats on an EFA deficient ration declined further with the addition of DDT. The growth of male rats was not affected by this diet. Fatty acid composition of liver lipids was altered also by EFA deficient rations containing DDT as follows: fatty acids 18:0, 20:3, 20:4, and 20:4<sub>ω6</sub> were increased with corresponding decreases in fatty acids 16:0, 14:0, and 16:1. These changes in liver lipid content, the authors suggest, is related to the DDT induced increase in the level of smooth endoplasmic reticulum tissue which is composed of the same proportions of fatty acids. In male rats with the EFA supplemented diet, DDT caused a 31% increase in liver size and a 38% increase in the proportion of the linoleic (ω 6) series of polyunsaturated fatty acids in liver lipids. The authors suggest that the increased proliferation of hepatic smooth endoplasmic reticulum induced by DDT could increase the demand for EFA by the liver thus influence EFA nutrition.

[1 figure, 3 tables, 9 references]

SW







Yee, William C. (Oak Ridge National Laboratory, Oak Ridge, TN 37830) Environmental Science & Technology 6, No. 3, 232-237 (Mar. 1972)

Thermal effluents from electric generating plants are of increasing public concern while demand for electrical power is expected to double in the next decade. For every kilowatt generated, between 1 and 2 kilowatts, as heat, will be produced and discharged into air or water as waste. This waste heat could be considered a resource that is applicable to aquaculture or aquaculture. The author surveys experimental applications of thermal effluents to growth of aquatic species. The Japanese, pioneers in aquaculture, have grown fish in running water under controlled thermal conditions with intensive feeding. Yields have been the equivalent of 800,000 to 3 million lb/acre/year in contrast to the 20 lb/acre/year of conventional hunting methods on U.S. coastal waters. In shrimp aquaculture, the Japanese reported a winter weight gain seven times that of shrimp cultured in ponds with no temperature control. Oyster farming on a commercial scale in Northport, L.I. uses coolant water from the adjacent utility plant. Intake water at an annual temperature range between 40° and 70° F. is warmed by heated effluent an additional 12° to 18° F. and discharged into a 7-acre lagoon at 150,000 g.p.m. This warmed water reduces the growing period of baby oysters by half. In another project catfish are cultured in effluent from the power plant at Lake Colorado City, Tex. Caged catfish are bathed in 70°-75° F. discharge water in the winter. Yields are equivalent to 100 tons/acre/year with intensive feeding. Other projects in the author's survey include: catfish culture by the Tennessee Valley Authority; oyster culture in Humboldt Bay; lobster (over)

Liao, I. C. (Tungkang Marine Laboratory, Taiwan Fisheries Research Institute, Tungkang, Taiwan) Collected Reprints Vol. 1, 207 pp. (1969-1971) Tungkang Marine Laboratory, Tungkang, Pingtung, Taiwan 916.

Seventeen papers initially published in other publications were assembled in one volume to make known the research activities of the laboratory. Most of the papers describe prawn culture as follows: artificial propagation; reproduction; feeds and feeding methods; and protein utilization. The information generated by this research was responsible for the mass production of Penaeus japonicus fingerlings for distribution to fish farmers who culture prawn in Taiwan.

Other papers in the collection relate to artificial propagation and induced breeding of grey mullet, Mugil cephalus Linnaeus. A more reliable source of mature spawners is now available for fish farmers of grey mullet on the island. There is also a note on the adult milkfish Chanos chanos with regard to egg production related to gonad weight.

SW

Chemical Abstracts 76, No. 5, 23233m (Jan. 31, 1972)

Kayama, Mitsuo, S. Zafar W. Rizvi, and Suez Asakawa (Fac. Fish. Anim. Husb., Hiroshima Univ., Fukuyama, Japan)

BIOSYNTHESIS OF SQUALENE AND CHOLESTEROL IN THE FISH.  
I. IN VITRO STUDIES ON ACETATE INCORPORATION

Collins, Richard A. (State College of Arkansas, Conway, AR 72032) Arkansas Game and Fish Commission, Little Rock, Ark., Report, 13 pp. (Aug. 1971) Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10056. NOAA Publications Announcement No. 72-5, Item 72-05-16-05, 5 (Feb. 1972)

Four different cage designs ranging in volume from 3 to 12 cubic yards were each stocked with 300 fingerling catfish per cubic yard to determine the effects of the different cage sizes on growth and conversion of the fish. Fingerlings were graded to a uniform size before being stocked in an attempt to eliminate the differential growth. Results indicate that in large reservoir lakes the cage size can be unlimited in surface area and as deep as the water containing adequate dissolved oxygen. The depth of the cages had no important bearing on the growth rate, and in the cages with the greater surface area the catfish grew more rapidly and converted food better. It was concluded that differential growth of catfish in cages is a result of initial variance of the fingerling fish and not to hierarchy. Large numbers of wild fish around the cages caused problems of loss of food and possibly introduction of diseases. The wild fish can, however, be effectively trapped in the area of the cages. The economic evaluation indicates the following situations: (1) a small-scale operation incorporated into an existing business such as a marina, and (2) a very large-scale operation (200,000 or more fish). (Author)

Reprinted

Levin, Arthur A., Thomas J. Birch, Robert E. Hillman, and Gilbert E. Raines (Battelle Memorial Institute, Columbus Laboratories, Columbus, OH 43201) Environmental Science & Technology 6, No. 3, 224-230 (Mar. 1972)

Because of public interest in possible environmental damage caused by warm water discharges from electric power plants into local bodies of water, the authors reviewed recent and ongoing studies on this subject. No major damage in the aquatic environment is indicated. Conditions at several locations were reported. At the Chalk Point fossil-fueled steam generating installation on the Patuxent River, Md., there was an increase in production of fauna in the warm effluent canal during the warmest months, but a decline in the number of species was cited; at the Connecticut Yankee plant on the Connecticut River, continuing studies indicate no drastic ecological change. However, the possibility of sublethal effects are suggested by 20% weight loss of white and brown bullhead catfish living in the warm effluent canal; reports on Turkey Point in Biscayne Bay, Fla., indicate heated effluents from the plant have reduced the diversity and abundance of algae and animals. Although mollusks and crustaceans increased somewhat, reports on the Martins Creek plant on the Delaware River, Pa., showed that heated waters attracted fish and enabled them to actively feed during the colder months. The authors estimate a doubling of total heat discharged to condenser cooling from 1967 to 1980. As more steam-electric plants become operative they suggest the necessity of improving the ability to predict response of affected ecosystems; in addition, they recommend evaluating the assimilative capacity of natural waters adjacent to the prospective plant site before proceeding (over)



9.16

CULTURING TROUT IN CAGES

Collins, Richard A. (State College of Arkansas, Conway, AR 72032) Arkansas Game and Fish Commission, Little Rock, Ark., Report 12 pp. (Sept. 1971) Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10055. NOAA Publications Announcement No. 72-5, Item 72-05-16-04, 5 (Feb. 1972)

The major objectives were to determine (1) the feasibility of culturing rainbow trout in cages from fingerlings to edible size during the cooler months of the year in warm-water lakes, (2) the proper stocking density in the cages, and (3) the economic feasibility of culturing trout in cages. Triplicate tests were made using cages stocked with 400, 600, and 700 rainbow trout fingerlings averaging 59g. each. After 115 growing days with 6 day/week feeding, the average weight of fishes in all cages was 163 g. One cage of selected fish were fed for an additional 34 days. These fish attained an average weight of 192 g. Food conversion during the majority of the experiment was 1.54. No significant reduction in feed consumption or growth was noted when water temperatures dropped to as low as 3.5°C; however, temperatures with the highest stocking densities showed no reduction in rate of growth. The cages with the lowest stocking densities showed no reduction in rate of growth. The author for frequent, periodic harvesting of shrimp. Economic considerations indicate favorable profit potential in some situations for the culture of trout in cages during the winter months. (Author)

Reprinted

91.6

MOBILIZATION OF MERCURIC SULFIDE FROM SEDIMENT INTO FISH UNDER AEROBIC CONDITIONS

61.6

FLOATING FISH GROWING TANK

U.S. Patent 3,653,358 (Apr. 4, 1972)  
Fremont, Howard J. (New York, N.Y.); assignor to Marine Protein Corp., New York, N.Y. (pat.)

A segmented chain of large floats support a large fish-growing tank. The tank consists of a flexible liner surrounded by a protective metal or nylon mesh.

MOLLUSC CLIP

Marcus, Douglas Larry, and Clifford L. Sayre, Jr. (Silver Spring, MD 20902) (pat.)  
U.S. Patent 3,656,458 (Apr. 18, 1972)

SW

The clip secures clutch material in the culture of molluscs.

[see references 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

9.16

THE BASICS OF BREEDING AND FINGERLING PRODUCTION OF CHANNEL CATFISH

Walker, Bobby T. (Louisiana Wildlife and Fisheries Commission) American Fish Farmer & World Aquaculture News 3, No. 5, 4-7 (Apr. 1972)

The author discusses several techniques in the culture of catfish fingerlings. Subject areas considered are: selection of brood stock, the sequence of events during the spawning process, the importance of quality of the water, and the receptacles used by the catfish for spawning. [5 illustrations]

[see references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

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[see references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223,



9.19 POLYCHLORINATED BIPHENYLS AND DDT ALTER SPECIES COMPOSITION IN MIXED CULTURES OF ALGAE

Mosser, Jerry L., Nicholas S. Fisher, and Charles F. Wurster (Marine Sciences Research Center, State University of New York, Stony Brook NY 11790) Science 176, No. 4034, 533-535 (May 5, 1972)

The effects of chlorinated hydrocarbons on photosynthetic algae, the base of aquatic food webs, have not been extensively studied. The hypothesis has been advanced that the species composition of phytoplankton communities could be altered because (1) the chlorinated hydrocarbon DDT and polychlorinated biphenyls (PCB) are widespread pollutants; (2) they are selectively toxic to sensitive algal species. To test this hypothesis two phytoplankton species were selected on the basis of their response to DDT and PCBs: the diatom *Thalassiosira pseudonana* (inhibited growth) and the green alga *Dunaliella tertiolecta* (growth not affected). Pure cultures of each organism and a 1:1 mixture of both were prepared. All cultures contained  $10^4$  growing cells per milliliter at zero time verified by cell count techniques. Cultures were treated with PCBs and DDT; growth as cell count was determined in 4 days.

The growth of *T. pseudonana* was inhibited by 25 p.p.b. of PCBs but not at 10 p.p.b. or less. Growth was significantly inhibited by 100 p.p.b. of DDT and slightly at 50 p.p.b. No inhibition occurred at 25 p.p.b. or less. The growth of *D. tertiolecta* was not affected at any of the concentrations of PCBs or DDT tested.

(over)

9.19 (0.30) CHLORINATED HYDROCARBON RESIDUES IN AIRBORNE FALLOUT

Södergren, A. (Department of Animal Ecology, Ecology Building, University of Lund, S-223 62 Lund, Sweden) Nature 236, No. 5347, 395-397 (Apr. 21, 1972)

Airborne particles were retained on a 200  $\mu$ m. nylon net impregnated with a thin film of silicone oil (SE 30). These nets were exposed in open places for 2 to 3 months at eight locations in southern Sweden. The nets were then treated in Soxhlet extractors with n-hexane for 48 hr. An extract of the n-hexane solution was prepared and injected on a gas chromatograph with electron detectors. The relative retention times were compared to the retention times of known substances. The identity of the more important peaks in the chromatograms were confirmed by chemical methods to be DDT and PCB.

Southern Sweden is subject to airborne material originating from industries along the west coast, the Copenhagen area, and heavily industrialized areas in West Germany. Five of the nets were located in agricultural districts, and two in cities, one of which was next to a municipal garbage incinerator. The average monthly levels in ng/m<sup>3</sup> of DDT and PCB trapped in the nets during the months of January, February and March 1971 show significant differences in regional distribution. A net situated in an agricultural district contained more PCB than the net located outside the incinerator. The evidence indicates that there is a general occurrence of PCB compounds in airborne fallout which increases in periods of high mean rainfall. Correlated with the prevailing winds, part of the PCB fallout may have originated outside the study area. No distinct distribution pattern

9.19

EUTROPHICATION OF LAKE 227, EXPERIMENTAL LAKES AREA, NORTHWESTERN ONTARIO, BY ADDITION OF PHOSPHATE AND NITRATE

Schindler, D. W., F. A. J. Armstrong, S. K. Holmgren, and G. J. Brunskill (Fishes Research Board of Canada Freshwater Institute, Winnipeg, Manitoba) Journal of the Fisheries Research Board of Canada 28, No. 11, 1763-1782 (Nov. 1971)

A lake that is eutrophic is rich in dissolved nutrients, frequently shallow and with seasonal oxygen deficiency in the lower, cooler, stagnant layers of water. [Eutrophication is the process of becoming more eutrophic either as a natural phase in the maturation of a lake or artificially as by fertilization.] A lake may deteriorate due to excessive growth of phytoplankton induced by eutrophication. Contribution of nutrients from a fully developed agricultural and industrial society may accelerate the process of eutrophication.

The relationship of phosphorus and nitrogen containing compounds and eutrophication was examined. The addition of phosphate and nitrate to a small unproductive lake caused a severalfold increase in growth of phytoplankton. Most of the phosphorus and nitrogen was taken up by the phytoplankton. Phosphorus is the primary limiting nutrient in phytoplankton production.

[26 figures, 3 tables, 74 references]

SW

9.2 A MODEL FOR OPTIMAL SALMON MANAGEMENT

Booth, Douglas E. (Fisheries Research Institute, 260 Fisheries Center, University of Washington, Seattle, WA 98195) Fishery Bulletin 70, No. 2, 497-506 (Apr. 1972)

Considerable attention has been given in the literature recently to continuous time dynamic maximizing models for fisheries in general, but the time discreteness and interdependency problems encountered in the case of most salmon fisheries have been largely ignored. Hence, a discrete time profit maximizing model for a salmon fishery is developed in this paper, and it is shown that a correct salmon management policy takes the form of an investment decision with respect to the level of escapement and that a management policy of maximum sustained yield may be incorrect from an economic standpoint. It is hoped that continued research including construction of a working model will provide some indication of the difference between the magnitude of spawner stocks selected on the basis of maximum sustained yield and stocks selected on the basis of economic optimality. [1 figure, 4 references]

Author's abstract

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Center, National Marine Fisheries Service, NOAA, Beaufort, NC 28516)

# DISTRIBUTION OF RADIOACTIVE AND STABLE ZINC IN AN EXPERIMENTAL MARINE ECOSYSTEM

9.19

These results suggest a competition for limited nutrients. As the ability of *T. pseudonana* to compete for nutrients was impaired by PCBs or DDT, more of the nutrients became available to *D. tertiolecta*. Natural algal communities could be altered in the same manner in a eutrophic environment. Suppression of growth of sensitive organisms would cause an increase in the bloom of resistant algae and ultimate deterioration of the ecosystem. Such pollutants may also suppress growth of phytoplankton species which are specific food for zooplankters. Thus animal populations higher in the food web would be adversely affected.

In addition, these results suggest that evaluation of pollutants in mixed cultures probably gives a more precise indication of algal sensitivity than in pure culture. [1 figure, 14 references]

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## 9.2 LIVING SYSTEMS: THE ORGANIZATION

Miller, James G. (Department of Psychiatry and Behavioral Sciences, The Johns Hopkins University School of Medicine, Baltimore, MD 21205)  
Behavioral Science 17, No. 1, 1-182 (Jan. 1972) (Mental Health Research Institute, University of Michigan, Ann Arbor, MI 48104)

This dissertation is an analysis in terms of the general systems behavior theory of present knowledge concerning one level of living system—the organization. [an exposition of the basic concepts of general systems behavior theory appeared in "Living Systems: Basic Concepts," *Behavioral Science* 10, 193-237 (1965)] The present article was written for the intelligent layman rather than for the expert. [23 figures, 7 tables, 402 references]

111

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Two *Pseudomonas* strains were isolated that are capable of using 2-phenylbutane, 3-phenylpentane, and 4-phenylheptane as the sole source of carbon and energy. Two *Nocardia* strains capable of using only 3-phenyldecane as the sole source of carbon and energy were isolated.

These compounds and their analogs are of interest because they are used as solvents and components of some synthetic detergents and herbicides and may be found as pollutants.

Baggi, G., D. Catelani, E. Galli, and V. Treccani (Institute of Agrarian and Technical Microbiology, University of Milan, 20133 Milan, Italy)  
*Biochemical Journal* **126**, No. 5, 1091-1097 (Mar. 1972)

THE MICROBIAL DEGRADATION OF PHENYLALKANES.  
2-2-PHENYLBUTANE, 3-PHENYLPENTANE, 3-PHENYLDODECANE AND  
4-PHENYLHEPTANE

9.19

## 9.2 THE NEW ECONOMIC POLICY AND UNITED STATES INTERNATIONAL OBLIGATIONS

Jackson, John H. (University of Michigan)  
American Journal of International Law 66, No. 1, 110-118 (Jan. 1972)

This article is a discussion of the relationship of three measures contained in the New Economic Policy to the United States international obligations under GATT and the IMF. The measures considered are (1) the imposition of a 10% tariff surcharge on most imports, (2) the suspension of U.S. willingness to buy and sell gold for dollars, and (3) a proposed statute which would provide a credit against income tax for a percentage of capital machinery purchases of companies, provided that the goods purchased were produced in the United States.

[14 footnotes]

FTP

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Order No. COM-72-10081.  
NOAA Publications Announcement No. 72-5, Item 72-05-16-06, 5 (Feb. 1972)

There were 181 private fish hatcheries and 1,364 private bait dealers licensed in Wisconsin in 1968 representing a capital investment of \$14,421

Bradley, Edward, and Sydney Staniforth  
Research Report, 32 pp. (Sept. 1971) Un-



9.2 OVER-FISHING: THE ECONOMIC AND TECHNICAL EFFECTS

Anonymous

Motor Ship 52, No. 620, 543-547 (Mar. 1972)

Awareness of the fact that some fisheries are being exploited up to and even past their limit is having impact on industry's ordering of fishing vessels, on the design of these vessels, and on ideas of how much these vessels should cost.

The fishing vessels of various European countries are discussed under the following headings: "The 'Vostok' in service too late," "Record catches by U.K. trawlers," "A 500-mile territorial limit for Iceland," "New generation of German trawlers," "Standard Norwegian designs" [stern trawlers], "Success of new U.K. wet-fish trawlers," "New factory trawlers from Brooke Marine," "Large French expansion programme," "Danish trawlers for Greenland," and "Japanese supertrawlers" for pollack fishing. FTP

The chapters in this volume present a summary of the present state of the science of the physiology of fishes. FTP

Hoar, W. S., and D. J. Randall (editors)  
Fish Physiology, Vol. 5, xvi + 600 pp. Academic: New York and London (October 1971), \$32; £14.95.  
H. W. Lissmann (reviewer)  
Nature 236, No. 5346, 358 (Apr. 14, 1972)

9.6 (9.10) SENSES OF FISH

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 7 PAGE 12

9.3 SYMPOSIUM LAW AND TECHNOLOGY

[Various authors and titles listed below]

Southern California Law Review 45, No. 2, i-xi and 397-614 (Spring 1972)

This report of the Symposium Law and Technology contains the Editors Note, a Preface by William O. Douglas (Associate Justice, U.S. Supreme Court), and Introduction by John G. Burke (College of Letters and Science, University of California, University Park, Los Angeles, CA 90007), and five articles as follows:

"The Federal Power to Protect the Environment: Available Devices to Compel or Induce Desired Conduct," by Albert J. Rosenthal (Columbia Law School), pp. 397-449. In this article, the author examines various ways in which the Federal government can compel or induce compliance with environmental standards. The sections of the article consist of "Introduction: The Constitutional Power of the Federal Government," "Direct Regulation," "Subsidies, Incentives and Charges," "Use of the Purchasing Power of the Federal Government," "A Word on Private Litigation," "International Actions," and "Conclusion." [236 footnotes]

"Should Trees Have Standing? -- Toward Legal Rights for Natural Objects," by Christopher D. Stone (University of Southern California), pp. 450-501. The author proposes seriously (that we give legal rights to forests, rivers, and other so-called "natural objects" in the environment) the natural environment as a whole. [138 footnotes]

Environmental Regulation of Power Plant Siting: Existing and Proposed Institutions," by A. Dan Laroock (Indiana University, Bloomington, Indiana), Roger Tippy, Frances Ensey, Francis, et al. pp. 502-569. The authors analyze the methods (over)

9.3 (9.19)

INTERNATIONAL LAW AND THE PROTECTION OF THE OCEANS FROM POLLUTION

Teclaff, Ludwik A. (Fordham University, 140 W. 62nd St., Lincoln Center, New York, NY 10023)

Fordham Law Review 40, No. 3, 529-564 (Mar. 1972)

Because marine pollution has only recently been recognized as a problem of global dimensions and extreme complexity, international law has not yet evolved specific rules for dealing with it. Prohibition of pollution must be sought in the general rules pertaining to the use of the sea. By necessity, these rules are vague and they can be made workable only by interpreting them as almost totally permitting or totally forbidding pollution. Once it is accepted that the duty not to pollute the high seas exists in international law, transgression of this duty must involve the responsibility of states and private enterprise.

notes 175 [1]

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The National Reference Library of Science and Invention has issued a list of journals of Japanese origin that contain articles on pure chemistry. The publication "Current Japanese Journals Containing Articles on Pure Chemistry," by G. J. Sassoon may be obtained free from the organization at 25 Southampton Buildings, London WC2, England.

Anonymous  
Chemistry and Industry No. 4, 135 (Feb. 19, 1972)

JAPANESE JOURNALS LIST

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 7 PAGE 12

9.3 (9.6) METHODS TO EXPEDITE ENVIRONMENT PROTECTION: INTERNATIONAL ECOSTANDARDS

Contini, Paolo, and Peter H. Sand (Food and Agriculture Organization of the United Nations, Rome, Italy)  
American Journal of International Law 66, No. 1, 37-59 (Jan. 1972)

One distinctive element of most contemporary action plans for international protection of the environment is the call for common international standards by which environmental degradation is to be monitored and controlled. "Alternatives" to traditional treaty making for the purposes of environmental protection do exist in contemporary international law. In fact, many states already participate in international standard setting for a variety of subjects, many of which are within the scope of "environmental management." The authors believe that the accumulated experience described in their article should serve as a guide in devising effective and flexible means to establish and preserve international standards.

notes 82 [1]

The World Health Organization (WHO) has prepared a catalog of its publications that were issued during the period 1947-1971. The catalog is available from HM Stationery Office, 49 High Holborn, London WC1V 6HB, England. FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 7 PAGE 12

WHO PUBLICATIONS

Anonymous  
Chemistry and Industry No. 4, 135 (Feb. 19, 1972)

Fenchel, Tom and Birthe J. Straarup (Mar. Biol. Lab., Helsingør, Denmark)  
Chemical Abstracts 76, No. 9, 44100f (Feb. 28, 1972)

9.11

Food and Agricultural Organization of the United Nations, Vol. 31, xix + 320 pp. (Published 1971) Department of Fisheries, FAO 00100 Rome, Italy.

Summaries; Fish, Fresh, Chilled or Frozen; Fish, Dried, Salted or Smoked; Crustaceans and Molluscs, Fresh, Frozen, Dried, Salted, Etc., Fish Products and Preparations, Whether or Not in Airtight Containers; Crustacean and Mollusc Products and Preparations, Whether or Not in Airtight Containers; Oil and Fats, Crude or Refined, of Aquatic Animal Origin; and Meals, Solubles and Similar Animal Feedstuffs, of Aquatic Animal Origin.

Copies may be purchased from the sales agents and booksellers for FAO publications or from the Distribution and Sales Section, FAO, 00100 Rome, Italy. Price US\$9.00. £3.60. FF45.00. SW

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9.125

9.3  
(9.19)

PA 19122)  
International and Comparative Law Quarterly 21, Part 1, 15-42 (Jan. 1972)

The draft United Nations Sea-Bed Proposal sets forth the generalized model for licensing, monitoring, policing, and administering the high seas. The author discusses an alternative proposal that begins a notch lower in the political spectrum and that involves a new hybrid form of regional seabed regimes. These pilot seabed regimes organized by regions would provide the working experience and psychological reassurances requisite to accepting control by the International Seabed Resources Authority. [61 Footnotes, appendix]

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with all the laws in force at one particular point in time.

This compilation was prepared at the request of the Hon. Warren G. Magnuson, Chairman, for the use of the Committee on Commerce, United States Senate (92d Congress, 2d Session). It contains the public laws relating to fish, wildlife,

Published by the U.S. Government Printing Office, Washington, DC 20402 (April 1972). xxv + 618 pp.

Prepared by the Legislative Reference Service, the Library of Congress, Washington, D.C.

9.3 COMPILATION OF FEDERAL LAWS RELATING TO CONSERVATION AND DEVELOPMENT OF OUR NATION'S FISH AND WILDLIFE RESOURCES, ENVIRONMENTAL QUALITY, AND OCEANOGRAPHY (9.17)

HUMAN ENVIRONMENT JOURNAL

Anonymous  
Chemistry and Industry No. 4, 135 (Feb. 19, 1972)

The Royal Swedish Academy of Sciences is publishing the journal "Ambio," which will appear bimonthly and will be published in English. The journal will contain articles on the interrelated fields of environmental management, technology, and the natural sciences. Annual subscription is \$13.00 and subscriptions should be sent to Universitetsforlaget, P.O. Box 307, Blindern, Oslo 3, Norway. FTP

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itself. [184 footnotes]

Journal of Maritime Law and Commerce 3, No. 1, 13-44 (Oct. 1971)

Gold, Edgar (Dalhousie Law School, Dalhousie University, Halifax, Nova Scotia, Canada)

The author concludes that sea pollution will increase in the future despite the unilateral and international efforts described in this report due to (1) the rapidly increasing tanker fleet, (2) the rapidly increasing size of tankships, and (3) the ever-increasing demand for oil throughout the world. Only massive and urgent international action, on an unprecedented scale, can alleviate the steadily deteriorating situation, and such action must take place at the highest qualified international level. The stake is nothing less than the quality of life itself. [184 footnotes]



## 5.6 POLISH FISH OILS AS A VALUABLE SOURCE OF VITAMIN D

Doboszynska, Boleslawa (Zakl. Bromatol., Akad. Med., Gdansk, Poland)  
Chemical Abstracts 76, No. 10, 49834h (Mar. 6, 1972)

(  
Magomae, V. A. (Dagest. Gos. Univ. im. Lenina, Makhachkala, U.S.S.R.)  
Chemical Abstracts 76, No. 10, 497399w (Mar. 6, 1972)

TECHNOLOGICAL IMPROVEMENT IN THE TREATMENT OF CASPIAN SEAL SKINS 98.9

FTP  
The quality of bread is improved by the incorporation of powdered tangle.

(661 781 4, No. 4, 1972)  
Japanese Patent 32782/71  
Food Technology 26, No. 4, 168 (Apr. 1972)  
Okano Food Ind. Co. Ltd. (pat.)

TANGLE ADDITIVE 43.9

3.2349 FISH MOLDING PROCESS CZ PAGE 4 ON 52 TOA SDVSTRSV FISHERIES FVJDCMOMCO

Holborow, D. G., and J. K. Messenger; Unilever Ltd. (pat.)  
Canadian Patent 885,939  
Food Technology 26, No. 4, 168 (Apr. 1972)

Unit portions of fish are prepared by an injection molding and freezing process.  
FTP

3.2349 FROZEN FISH PRODUCTS

Schjölberg, E. (pat.)  
Canadian Patent 887,024  
Food Technology 26, No. 4, 168 (Apr. 1972)

Ground fish is formed and frozen into shaped products.

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Fish or meat are treated, alternately, to pressurized steam and to vacuum to extract the loose fluids from the uncooked meat.

(661 781 4, No. 4, 1972)  
Food Technology 26, No. 4, 168 (Apr. 1972)  
British Patent 1,253,318  
EEFP Corp. (pat.)

MEAT AND FISH PRESERVATION (3.63)  
3.19

## 3.12 SEAFOOD PRESERVATION

Sankyo Co. Ltd. (pat.)  
Japanese Patent 39058/71  
Food Technology 26, No. 4, 170 (Apr. 1972)

Catechin (from tea leaves) is used to preserve seafood products.

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FTP  
Food is added to food.

(661 781 4, No. 4, 1972)  
Food Technology 26, No. 4, 170 (Apr. 1972)  
U.S. Patent 3,607,311  
Hass, G. J. J. N. Insalata (pat.)

BOTULINUM EXOTOXIN INHIBITED FOODS 3.11

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(Abstractor's note: this is not permitted in the United Kingdom.)  
The concentration of preservative in the ice was about 2 g/litre of the water. The concentration of preservative in the ice was about 2 g/litre of the water. The concentration of preservative in the ice was about 2 g/litre of the water.

(261 781 4, No. 4, 1972)  
Food Technology 26, No. 4, 170 (Apr. 1972)  
U.S. Patent 3,607,311  
Hass, G. J. J. N. Insalata (pat.)

FISH PRESERVATIVE 21.3

3.2349 APPARATUS FOR DEEP FAT FRYING OF FOODSTUFFS CZ PAGE 4 ON 52 TOA SDVSTRSV FISHERIES FVJDCMOMCO

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(2.8)

Wilkinson, Raleigh J. (Arlington Heights, Ill.); assignor to Quaker Oats Co., Chicago, Ill. (pat.)  
U.S. Patent 3,641,923  
Official Gazette of the U.S. Patent Office 895, No. 3, 868 (Feb. 15, 1972)

Food products are deep fat fried in a continuous looped tube. The tube has an entry port at one end and a discharge port at the bottom of the forward end. An inert atmosphere can be supplied at the top of the loop.  
FTP

Reprinted

Apparatus for filling fish fingers into open-ended rectangular or square cartons is described. The equipment positions the product in the carton by means of a pushing action.

(661 781 4, No. 4, 1972)  
Food Technology 26, No. 4, 170 (Apr. 1972)  
British Patent 1,249,389  
BFMIRA Abstracts 24, No. 12, Abstract No. 4, 172, 848 (Dec. 1971)

APPARATUS FOR PACKAGING FISH AND VARIOUS OTHER PRODUCTS

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<p>3.12 FISH PRESERVATION</p> <p>Ueno Seiyaku Oyo Kenkyosho KK (pat.) Japanese Patent 34736/71 Food Technology <u>26</u>, No. 4, 168, 170 (Apr. 1972)</p> <p>Alkali, or ammonium salts of gluconic acid, is added to minced fish meat and the product is then frozen.</p> <p>FTP</p> <p>3.17 FISH PRESERVATION</p> <p>Sakamoto, N. (pat.) Japanese Patent 38542/71 Food Technology <u>26</u>, No. 4, 170 (Apr. 1972)</p> <p>Zeolite or silicate clays are incorporated into the ice used for storing fresh fish and shellfish.</p> <p>FTP</p> <p>3.5 LACTIC ACID IN BEEF JERKY</p> <p>Berberian, Antoline (Brazil) Chemical Abstracts <u>76</u>, No. 5, 23889e (Jan. 31, 1972)</p>	<p>6.54 FISH SOUP</p> <p>Konser Vipapi Troszt (pat.) German Patent 1,943,414 Food Technology <u>26</u>, No. 4, 168 (Apr. 1972)</p> <p>This product is a Hungarian fish soup containing fish-meat broth, ground red paprika, onion powder, salt, flavoring materials, fat, and sodium glutamate. FTP</p> <p>6.54 CHEWING GUM WITH FREEZE-DRIED FOOD PARTICLES</p> <p>Echeandia, James F., and Robert M. Lehman (Richmond, Va.); assignors to Philip Morris Inc., Richmond, Va. (pat.) U.S. Patent 3,632,358 Official Gazette of the U.S. Patent Office <u>894</u>, No. 1, 277 (Jan. 4, 1972)</p> <p>The chewing gum contains particles of freeze-dried food which are small in size but large enough to be visible.</p> <p>FTP</p> <p>Immature herring roe are first soaked in a solution of a carboxylic or inorganic acid, then they are soaked in a solution containing aluminum salt. The product is then sprinkled with salt.</p> <p>FTP</p> <p>6.54 FISH ROE PRODUCTS</p> <p>Nichiro Fisheries Co. Ltd. (pat.) Japanese Patent 34734/71 Food Technology <u>26</u>, No. 4, 168 (Apr. 1972)</p>
<p>3.2 OYSTER OPENING MACHINE</p> <p>Lanier, Leo H. (pat.) U.S. Patent 3,659,496 (Apr. 11, 1972)</p> <p>An oyster-opening machine which uses pneumatic power to actuate an anvil and bit to mechanically separate the shells is described.</p> <p>WS</p> <p>3.2 AUTOMATIC SHRIMP SHELLING MACHINE</p> <p>Anonymous Fd Trade Rev. No. 6, 6, 17, 17, 17 (1971) BFMIRA Abstracts <u>25</u>, No. 2, Abstract No. 595 (Feb. 121, 1972)</p> <p>A Dutch machine, claimed to shell 3900 shrimps per hour, is reported. The keeping qualities of the mechanically-shelled shrimps are said to be considerably better than those of hand-shelled shrimps. D.B.</p> <p>2.0 GREENING OF CANNED SHELLFISH. V. SEASONAL VARIATION AND CORRELATION WITH THE METAL CONTENT OF THE GREEN PIGMENT CONTENT OF OYSTERS</p> <p>Osada, Hiromitsu (Toyo Junior Coll. Food Technol., Kawanishi, Japan) Chemical Abstracts <u>76</u>, No. 5, 23885a (Jan. 31, 1972)</p>	<p>3.336 STRUVITE INHIBITION</p> <p>Chiyoeda Kagakukogyosho KK (pat.) Japanese Patent 34735/71 Food Technology <u>26</u>, No. 4, 168 (Apr. 1972)</p> <p>Calcium lactate (or other calcium salts of organic acids) is added to the fish to be canned.</p> <p>FTP</p> <p>3.336 FISH SEASONING</p> <p>Hayashibara KK (pat.) Japanese Patent 36179/71 Food Technology <u>26</u>, No. 4, 170 (Apr. 1972)</p> <p>A seasoning solution containing maltose is used to inhibit the release of CO<sub>2</sub> from canned fish products.</p> <p>FTP</p> <p>Amino acids are added to inhibit the formation of struvite.</p> <p>3.336 CANNED FISH PRESERVATION</p> <p>Osakabe, I. (pat.) Japanese Patent 36180/71 Food Technology <u>26</u>, No. 4, 170 (Apr. 1972)</p>



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# UNITED STATES DEPARTMENT OF COMMERCE

Peter G. Peterson, Secretary

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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## NATIONAL MARINE FISHERIES SERVICE

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### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



0.5 KINETICS OF CONFORMATION CHANGE OF SPERM-WHALE MYOGLOBIN.  
I. FOLDING AND UNFOLDING OF METMYOGLOBIN FOLLOWING pH JUMP

Shen, Linus L., and Jan Hermans, Jr. (Department of Biochemistry, University of North Carolina, Chapel Hill, NC 27514)  
Biochemistry 11, No. 10, 1836-1849 (May 9, 1972)

Studies on the denaturation of proteins were performed to elucidate the structure of proteins in solution.

Spectrophotometric observations were made to follow the denaturation of myoglobin caused by a series of pH changes in the range of 3.0 to 4.5. Spectral shifts were observed over a period of time. From these data three states were defined: starting product, and one or more transiently stable intermediates. The rates at which the intermediate products were formed were also determined. The denaturation of myoglobin was reversible with shifts in pH, while rates of transition were determined.

MS [3 figures, 25 references]

0.39 OCCURRENCE OF GABA [ $\gamma$ -AMINOBUTYRIC ACID] AND TAURINE  
IN THE NERVOUS SYSTEMS OF THE DOGFISH AND SOME INVERTEBRATES

Osborne, N. N. (Wellcome Lab. Pharmacol., Univ. St. Andrews, Fife, Scotland)  
Chemical Abstracts 76, No. 11, 56649v (Mar. 13, 1972)

0.321 KINETICS OF CONFORMATION CHANGE OF SPERM-WHALE MYOGLOBIN.  
III. FOLDING AND UNFOLDING OF APOMYOGLOBIN AND THE  
SUGGESTED OVERALL MECHANISM

Shen, Linus L., and Jan Hermans, Jr. (Department of Biochemistry, University of North Carolina, Chapel Hill, NC 27514)  
Biochemistry 11, No. 10, 1845-1849 (May 9, 1972)

In previous work the authors performed experiments to elucidate the structures of intermediate forms of metmyoglobin evolved during denaturation of this protein. In these experiments the rates of unfolding of derivatives of myoglobin were further defined at various pH levels.

[2 figures, 20 references]

MS [3 figures, 8 references]

0.6 THE EMULSIFYING PROPERTIES OF PURIFIED MUSCLE PROTEINS

Tsai, R., R. G. Cassens, and E. J. Briskey (Muscle Biology Laboratory, University of Wisconsin, Madison, WI 53706)  
Journal of Food Science 37, No. 2, 286-292 (Mar.-Apr. 1972)

Isolated muscle proteins (myosin, actin, tropomyosin-troponin, sarcoplasmic protein) were evaluated in terms of their ability to form emulsions and of the stability of these emulsions. The emulsifying capacity of all the proteins decreased as the protein concentration increased; the emulsifying capacity of all three became equal at a concentration of 12 mg./ml. Thus, meat proteins such as myosin, actin, tropomyosin-troponin, and sarcoplasmic protein probably have equal emulsifying capacities at high concentrations. Low concentrations (2-4 mg./ml.) of sarcoplasmic protein and tropomyosin-troponin have a greater emulsifying capacity than do myosin and actin.

Core samples were prepared from protein-lipid emulsions and were cooked to determine the effect of cooking on weight change of emulsions of the specific muscle proteins. The emulsions that contained myosin showed no weight loss on cooking. The actin-cooked emulsions lost some weight. Tropomyosin-troponin-containing emulsions disintegrated entirely after only a few minutes of cooking. Myosin formed a more stable gel after heating than did actin and the sarcoplasmic proteins.

0.5 A 24-HOUR METHOD FOR THE DETECTION OF COAGULASE-POSITIVE  
STAPHYLOCOCCI IN FISH & SHRIMP

Insalata, N. F., C. W. Mahnke, W. G. Dunlap, and C. C. Beazley (General Foods Corporation, Post Division, Battle Creek Operations, 275 Cliff Street, Battle Creek, MI 49016)  
Food Technology 26, No. 5, 78, 80-82 (May 1972)

A rapid microbiological screening method was developed for the detection of coagulase-positive staphylococci in fish and shrimp within 24 hr. of elapsed test time. The enrichment coagulase slide method is direct and sensitive. It detects coagulase-positive staphylococci in contamination levels in excess of 100 organisms per gram. The method is suitable for routine use with facilities commonly available in laboratories of the fish industry.

FTP [1 figure, 3 tables, 13 references]

0.5 BACTERIOPHAGE AND THE TOXIGENICITY  
OF CLOSTRIDIUM BOTULINUM TYPE C

Eklund, M. W., F. T. Poyosky, Stephanie M. Reed, and Cathy A. Smith (Technol. Lab., Natl. Mar. Fish. Serv., Seattle, Wash.)  
Chemical Abstracts 76, No. 13, 69988bq (Mar. 27, 1972)

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0.6 THE EMULSIFYING PROPERTIES OF PURIFIED MUSCLE PROTEINS

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# N-DIMETHYLNITROSAMINE IN TOBACCO SMOKE CONDENSATE

Rhoades, John W., and Donald E. Johnson (Department of Chemistry and Chemical Engineering, Southwest Research Institute, 8500 Culebra Road, San Antonio, Tex. 78284)  
 Nature 236, No. 5345, 307-308 (Apr. 7, 1972)

A nitrosamine (N-dimethylnitrosamine) was identified in cigarette smoke condensate using a newly developed gas chromatographic method. In addition, tobacco variety and soil growing conditions were found to be related to quantity of N-nitrosamine in cigarettes. The authors suggest that tobacco variety and soil conditions could be selected to produce cigarettes containing a minimum of N-nitrosamines. [2 figures, 1 table, 2 references]

A comprehensive literature review with 159 references is presented. C.S.B. Reprinted

# N-NITROSAMINES, FACT AND FICTION

Schuller, P. L.  
 Voeding 33, No. 2, 76-92 (1972) (In Dutch)

BFMIRA Abstracts 25, No. 5, Abstract No. 1702, 345 (May 1972)

# FORMATION OF N-NITROSODIMETHYLAMINE FROM NATURALLY OCCURRING QUATERNARY AMMONIUM COMPOUNDS AND TERTIARY AMINES

Fiddler, Walter, John W. Pensabene, Robert C. Doerr, and Aaron E. Wasserman (Eastern Marketing and Nutrition Research Division, Agricultural Research Service, 81161 VA U.S. Department of Agriculture, Philadelphia, Pa.)  
 Nature 236, No. 5345, 307-308 (Apr. 7, 1972)

Food products as potential sources of nitrosamines (carcinogenic in laboratory animals) are causing concern. Nitrosamine (dimethylnitrosamine) was formed from several quaternary ammonium compounds and related tertiary amines in conditions simulating those found in preserved, minced meat products containing sodium nitrite. The authors suggest that the tertiary amines and free secondary amines in food products as specific sources of nitrosamines must be considered. [1 table, 4 references]

# ANTIBACTERIAL AND STAPHYLOCOCCICIDAL MEDICINE

Gheorghe, Vasile, Manole Cucu, Mariola Manea, and Elena Andronache (Institutul de Igiena si Sanatate Publica Bucuresti) (pat.)  
 German Offen. (Patent) 2,128,249 (Dec. 30, 1971)  
 Chemical Abstracts 76, No. 20, 117496b (May 15, 1972)

# PSYCHO-PHYSICAL ANALOGUES

Morrow, C. T. (Department of Agricultural Engineering, Pennsylvania State University, University Park, PA 16802)  
 Food Technology 26, No. 5, 92, 94, 96, 98 (May 1972)

The author discusses the psycho-physical analogue approach to measurement of food texture. The psycho-physical analogues are defined as a model system which attempts to explain the relationship between psychological and physical measurement. [18 references]

FTP

Spun textured vegetable protein products are produced from a protein "mesophase" instead of the alkaline spinning dope previously used. This mesophase is prepared by suspending the protein in a salt solution and has the advantage that high pH is not used which could cause denaturation of the protein. Reprinted

# PROTEIN PRODUCTS

Unilever Ltd. (M.P. Tombs) (pat.)  
 British Patent 1,265,661

BFMIRA Abstracts 25, No. 5, Abstract No. 1877, 380 (May 1972)

# INTERACTION OF SODIUM NITRATE [sic], OXYGEN AND pH ON GROWTH OF STAPHYLOCOCCUS AUREUS

Buchanan, Robert L., and Myron Solberg (Department of Food Science, College of Agriculture & Environmental Science, Rutgers, The State University, New Brunswick, NJ 08903)  
 Journal of Food Science 37, No. 1, 18-18-55 (Jan.-Feb. 1972)

Sodium nitrate serves as a color fixative and preservative in cured meats. Earlier work has shown that sodium nitrite inhibits growth of a variety of bacteria in fish muscle under initial acidic pH conditions. There is, however, the potential for nitrite to participate in the formation of nitrosamines. For this reason, it is necessary to obtain a complete understanding of the function of nitrite in foods to establish safe usage levels. Earlier work has shown that pH and oxygen pressure influence the bacteriostatic action of sodium nitrite toward *S. aureus*. The purpose of the present study, therefore, was to determine the effects and interactions of sodium nitrite (in concentrations of 200, 500, 1,000, and 2,000 p.p.m.), initial pH (6.3 and 7.3), and partial pressure of oxygen and 160 mm on the growth of a food-poisoning strain of *S. aureus* in broth (Brain-Heart Infusion) cultures.

Sodium nitrite inhibited *S. aureus* by extending the adjustment phase, by decreasing the rate of growth, and by damaging or destroying the cells. The magnitude of this inhibition depended upon the concentration of sodium nitrite, the initial pH of the partial pressure of oxygen. Under aerobic conditions, *S. aureus* remains unchanged. Aerobic cultures of *S. aureus* show an initial decrease in pH, then a rise in pH to a level greater than the initial pH. Anaerobic cultures of the organism show a decrease in pH and then remain at the maximum pH decrease level. [9 figures, 27 references]



0.6 CHANGES IN THE LIPID SOLUBLE CARBONYLS OF BEEF MUSCLE DURING AGING

Sink, J. D., and P. W. Smith (Division of Food Science & Industry, Pennsylvania State University, University Park, PA 16802)  
Journal of Food Science 37, No. 1, 181-182 (Jan.-Feb. 1972)

The data reported in this article represents part of a study of the flavor components of beef muscle. Samples of the longissimus dorsi muscle of a steer were excised from the rib after exsanguination (0-day), and after 3, 8, and 14 days of aging at 3° C. Analysis for carbonyls were made on the hexane extracts of the muscle.

The total carbonyl content, as well as the amount of monocarbonyls, increased during aging of the muscle. The monocarbonyls accounted for about 35% to 40% of the total carbonyls present; the methyl ketones constituted about 75% to 87% of the monocarbonyls. The significance of these findings to the flavor of the beef muscle has not been determined, but the authors are working to determine the specific chemical composition of each carbonyl fraction and to relate these observations to taste panel evaluations of the cooked meat samples. The data are summarized in the table that follows.

(over)

0.6 COLORING FOODS WITH CAROTENOIDS

Gordon, Howard T. (Roche Chemical Division, Hoffmann-La Roche Inc., Nutley, NJ 07110)  
Food Technology 26, No. 5, 64, 66 (May 1972)

Fruits, vegetables, dairy products, shrimp, lobster, and leaves contain carotenoids. These natural pigments range in color from light yellow to dark red. Over 100 carotenoids have been identified and almost all of them have been synthesized in the laboratory. Three are commercially available in the United States--beta carotene, apo-carotenal, and canthaxanthin. The three are permanently listed Food and Drug Administration approved additives that do not require batch certification.

Beta carotene is light yellow to orange; apo-carotenal is light orange to reddish orange; and canthaxanthin is tomato red. All three are insoluble in water at 75° F. At the same temperature, they are slightly soluble in ethanol and in vegetable oils and fairly soluble in chloroform. Beta carotene shows 1,666,667 I.U./g. of vitamin A activity; apo-carotenal shows 1,200,000 I.U./g.; but canthaxanthin shows none.

The advantages of using the carotenoids to color foods are as follows: (1) They are not affected by reducing substances in foods such as ascorbic acid. (2) They simulate natural colors better than do azo dyes. (3) They are stable in the pH ranges found in foods. (4) Beta carotene and apo-carotenal have provitamin A activity. (5) Because they are synthetically prepared, supply and quality problems are minimized.

(over)

0.8 (9.19)

USABLE WATER FROM RAW SEWAGE

Woodbridge, David D., Leland A. Mann, and William R. Garrett (University Center for Pollution Research of Florida Institute of Technology, Melbourne, Fla. and Energy Systems, Inc., Melbourne)  
Bulletin of Environmental Contamination and Toxicology 7, No. 2/3, 80-86 (Feb.-Mar. 1972)

The authors predict that by the year 2020, the demand for fresh water in the United States will exceed the supply. Today, water is being wasted and the conventional sewage treatment plant is an example of this wastefulness. Chemical treatment of sewage, for example, merely exchanges one type of pollution for another type. With these considerations in mind, the authors investigated the use of nuclear irradiation treatment of sewage. A pilot irradiation treatment plant was developed at the University Center for Pollution Research of the Florida Institute of Technology and a small commercial treatment plant was installed at a campground in Palmdale, Fla. Cobalt-60 was used as the irradiation source.

After 3 years of operation of the test facility at the University Center for Pollution Research and 1 year of operation of the commercial facility the authors concluded that usable water can be obtained by irradiation treatment of raw sewage. The unfiltered effluent from irradiation-treated sewage could be used directly for irrigation purposes. The effluent contained no residual pollutant; it was odorless; the organic content of the effluent had been broken down; the effluent contained few of the bacteria and viruses originally present in the sewage;

(over)

1.0116 (1.9) THE STATUS OF THE SCIAENID STOCKS OF THE MIDDLE ATLANTIC COAST

Joseph, Edwin B. (Virginia Institute of Marine Science, Gloucester Point, VA 23062)  
Chesapeake Science 13, No. 2, 87-100 (June 1972)

Population trends of the Atlantic croaker (*Micropogon undulatus*), the weakfish (*Cynoscion regalis*), and the spot (*Leiostomus xanthurus*) were described from historical catch records. Croaker populations north of Cape Hatteras increased from low levels at the beginning of the century to a high level in the early 1940's, but declined precipitously thereafter. The author suggests that climatic factors rather than overfishing caused the change.

Weakfish stocks were high at the beginning of the century and up to the 1930's. The steep decline since that time may be related to overexploitation in part, but it may also have been influenced by widespread use of DDT.

Stocks of spot, the author suggests, have declined in the northern part of the range, but populations in Chesapeake Bay show only random year-to-year fluctuations typical of short-lived cycle species.

[6 figures, 3 tables, 22 references]

SW

0.8  
(9.16) (9.2) SYSTEMS ENGINEERING OF OYSTER PRODUCTION. OPTIMIZATION OF AN OYSTER PRODUCTION SYSTEM IN THE PRESENCE OF UNCERTAINTY

Costello, Frederick A., and Brent L. Marsh (College of Engineering, University of Delaware, Newark, DE 19711)  
Publication No. 2EN066, College of Marine Studies, University of Delaware, Newark, DE 19711 (May 1972), 55 pp.

The authors prepared a model of a closed-cycle system for rearing commercially valuable oysters. The work is based on research carried out on the stochastic optimization (that is, optimization in the presence of uncertainty) for a closed-environment oyster production facility. They considered three types of uncertainty important to the oyster production system as follows: (1) uncertainty in primary system process parameters, (2) uncertainty in design variables, and (3) uncertainty in subsystem process functional relations. The appendix consisted of: Part I Automated Systems Analysis Program, Part II Output from Systems Analysis Program (listing of Algae System Simulation Program, listing of Variables Found in Algae Program, Summary of Cost Variables and Relation to Independent Variables). [2 tables]

FTP

----- [caption 1, 'eprag 1'] -----

----- [caption 1, 'eprag 1'] -----  
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(61'6) 8'0

2.05 FOOD POISONING DUE TO BACTERIOLOGICALLY CONTAMINATED FOOD

Kenderekli, S.  
Fleischwirtschaft 51, No. 9, 1326-1328 (1971) (In German, English summary)  
BfMIRA Abstracts 25, No. 1, Abstract No. 112, 24 (Jan. 1972)

A general review of food poisoning caused by micro-organisms is presented with 29 references. C.S.B. Reprinted

----- [caption 1, 'eprag 1'] -----

Swiss white mice ranging in weight from 20 to 40 grams were injected intraperitoneally with a suspension containing *C. botulinum* 33A 5 x 10<sup>8</sup> spores per ml. The mice were more sensitive to the toxin than were the heavier mice. Mice of different sex showed no significant difference in their response to the toxin. The authors suggest that liberation of spores from spore-bound toxin in are different

Booth, Ron, Jon B. Suzuki, Pat E. Berg, and Nicholas Grez (Biophysics Laboratory, Department of Biology, Illinois Institute of Technology, Chicago, IL 60616)  
Journal of Food Science 33, No. 1, 181-183 (Jan.-Feb. 1972)  
INFLUENCE OF WEIGHT AND SEX OF MICE IN ASSAYING SPORE-BOUND CLOSTRIDIUM BOTULINUM TYPE A TOXIN (5'0) 5'0'2

0.6 THE DETERMINATION OF THE WATER-BINDING CAPACITY OF MEAT AND THE STATISTICAL EVALUATION OF THE RESULTS

Brendl, J., and S. Klein  
Dc. Lebensmittelrdsch. 67, No. 10, 353-356 (1971) (In German, English summary)  
BfMIRA Abstracts 25, No. 1, Abstract No. 181, 38 (Jan. 1972)

A modified compression method for the determination of the water-binding capacity of meat is described. A detailed statistical analysis of the results is given. C.S.B. Reprinted

----- [caption 1, 'eprag 1'] -----

spunndomcom lynuoc	sayp	sayp	sayp	sayp	sayp
10'0	20'0	20'0	40'0	40'0	40'0
30'0	20'0	20'0	00'0	00'0	00'0
47'5	82'3	28'3	68'0	68'0	68'0
92'9	94'7	15'7	69'1	69'1	69'1
46'1	19'1	20'1	05'9	05'9	05'9
sayp	sayp	sayp	sayp	sayp	sayp
41	8	3	0	0	0

for 'C' at age 1  
piz feeq wrom pizatosi spunndomcom  
lynuoc fo (pidil g/M<sup>2</sup>) tunomu

spunndomcom  
lynuoc

0.6 (0.7) PROCESSING DAMAGE TO PROTEIN FOODS

Bender, A. E.  
PAC Bull. [FAO/WHO/UNICEF, United Nations, New York, N.Y., 2, No. 1, 10-19 (1971)  
BfMIRA Abstracts 25, No. 5, Abstract No. 1673, 339-340 (May 1972)

This paper was originally presented at the 18th PAC meeting held in Rome during 1971. The author emphasizes that three factors must be considered when examining the effect of processing on proteins. These are that changes in nutritive value are unimportant if the food is a minor part of the diet, inadequate methods of assessing nutritive value may lead to wrong conclusions and since the nutritive value of many diets is limited by sulphur amino acids, the Maillard reaction involving lysine is of little significance. The most important factors in processing damage are heat, the presence of moisture and reducing substances. Little damage occurs during normal home cooking of foods but poor control of some manufacturing conditions can lead to extensive damage in commercially processed protein foods. L.P. Reprinted

----- [caption 1, 'eprag 1'] -----

They do not cover the full range of colors--only yellow to orange to red. (2) Some of the forms are slightly inconvenient to use. For these forms, the use of stock solutions prepared daily is recommended. (3) They are more expensive in most uses than are competitive colors. [caption 1, 'eprag 1']



2.110. MORE NEW SHIPS FOLLOW 'VOSTOK' INTO USSR FLEET  
Young, Edgar P.  
Fishing News International 11, No. 5, 58-61 (May 1972)

The mothership Vostok was completed in December 1971 and is now operating with her fleet of 14 catcher vessels in the middle Atlantic. In the same month, the prototype of five large ships designed mainly for the production of fish meal at sea was launched in a U.S.S.R. shipyard. This new vessel, called the Pos'yev was described in the January 1972 issue of the magazine Sudostroyniy (Shipbuilding). In the February 1972 issue of the magazine a new Meridian class stern trawler was described. The present article describes the Pos'yev and Meridian vessels based on the information contained in the two articles in Sudostroyniy.

The Meridian is a shelter-deck factory stern trawler. It was intended for operation in medium latitudes but is suitable for work in tropical waters. The Meridian is designed to fish for and process cod, hake, turbot, sea bream, herring, and sardines. The fish are frozen aboard as whole fish or filets. Waste fish and offal are processed into fish meal and oil.

The factoryship Pos'yev is intended to operate in conjunction with a fleet of catcher vessels. She will be able to produce fish meal and oil, and to process fish into skinned frozen filets, whole frozen fish, roe, frozen fish paste, and vitamin A oil. The Pos'yev and four sister ships appear to be destined for the Soviet Far East Fleet. Mintai or Alaska pollock will probably be the main source of raw material. Basic specifications on the two vessels are shown in the table that follows.

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 5

2.116 INVESTIGATIONS INTO THE RELATION BETWEEN INTEGRATED  
(2.146) ECHO VOLTAGE AND FISH DENSITY

Thorne, Richard E. (Fisheries Research Institute, College of Fisheries, University of Washington, Seattle, WA 98195)  
Journal of the Fisheries Research Board of Canada 28, No. 9, 1269-1273 (Sept. 1971)

Commercial fish populations have been estimated traditionally either directly by recovery of marked fish or indirectly from catch per unit of effort. To reduce the effort and money required by these methods use of acoustic equipment provides a promising alternative. The output from integrators is translated into numbers of fish. These instruments cannot distinguish single from multiple targets, thus the number of fish counted will be an underestimate if the fish are densely concentrated. Two modifications of an echo integrator design were investigated to determine if they could be utilized in estimating fish density more accurately. An echo integrator works with an echo sounder to measure the total voltage of echoes received from a given depth and sums the voltages over time. Density of fish and instrument estimates were compared with catches using midwater trawls. Sockeye salmon (*Oncorhynchus nerka*) were netted in Lake Washington. Pacific herring (*Clupea pallasii*) and Pacific hake (*Merluccius productus*) were netted in Puget Sound. The tests with the signal from the echo sounder were taken from the design used in which the signal was time-varied (VGL) circuit in the modification. The initial catches were small; the highest densities were below one fish per pulse. Integration and net catch were linearly related. In high-density catches relation to integration deviated from linearity and related more to

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 5

2.116 ESTIMATION OF THE PACIFIC HAKE (*MERLUCCIVUS PRODUCTUS*)  
POPULATION IN PORT SUSAN, WASHINGTON, USING  
AN ECHO INTEGRATOR

Thorne, Richard E., Jerry E. Reeves, and Alan E. Millikan (Fisheries Research Institute, College of Fisheries, University of Washington, Seattle, WA 98195)  
Journal of the Fisheries Research Board of Canada 28, No. 9, 1275-1284 (Sept. 1971)

The procedures for estimating abundance of fish based echogram marks or echo traces from schools are often subjective because of difficulties in interpreting echo indications.

An acoustical census of the hake in Port Susan was undertaken. The objectives were to obtain an estimate of the spawning population for management purposes, to evaluate the echo integrator as a tool for estimating fish population and to develop techniques for future enumeration of hake in Port Susan. The hake stock of Port Susan was selected for study because ecological, fishery, biological, and genetic data are available for reference. Estimates of hake population in Port Susan prepared in 1969 were compared to estimates accomplished in 1970. The 1969 estimates were based on use of a simple voltage integrator. The 1970 estimate utilized a voltage squared integrator which increased objectivity and enabled estimation of confidence levels. The acoustical estimates were calibrated to net hauls. The comparison between 1969 and 1970 estimates indicated a decrease in spawning stock size. The decrease was attributed to variation of stock present in Port Susan, at the time of the census, and not to overfishing.

SW

[5 figures, 2 tables, 17 references]

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 5

2.119 MARINE TECHNICIANS HANDBOOK PROCEDURES FOR SHIPBOARD DIVING  
AND THE UNIVERSITY GUIDE FOR DIVING SAFETY

[Authors as indicated below]

Sea Grant Publication No. 15, Institute of Marine Resources, P.O. Box 109, La Jolla, CA 92037 (Nov. 1971), 23 + E4 + S4 pp. Price \$1.25.

The "Procedures for Shipboard Diving" were prepared by James R. Stewart (Scripps Institution of Oceanography, La Jolla, Calif.). The "University Guide for Diving Safety" was promulgated by the University Conference of Environmental Health and Safety Officers. The Guide was prepared to assist all university institutions in developing underwater safety programs that will foster reciprocity of diver certification among the institutions.

The report is divided into three parts. Part I is the "University Guide for Diving Safety." Part II is the "Emergency Procedures for University Divers in the La Jolla Area." Part III is the "Marine Technician's Handbook Procedures for Shipboard Diving."

PLP

Chemical Abstracts 76, No. 5, 21758n (Jan. 31, 1972)

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Carlson, Richard W., Richard C. Schaeffer, Jr., Ronald G. La Grange, Carmel H. Roberts, and Findlay E. Russell (Sch. Med., Univ. South. California, Los Angeles, Calif.)

PHARMACOLOGICAL PROPERTIES OF THE VENOM OF THE  
SCORPIONFISH *SCORPAENA GUTTATA*

2.9

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 5



the square of the voltage. In test trawls for herring, model number two of the echo integrator design was used. This modification included a TVG circuit which amplified the signal voltage in proportion to depth to equalize echoes from fish at different distances. The signal was taken from the IF part of the echo sounder, rectified, amplified and put through to the integrator, peak detector, and pulse counter. The herring catch at night indicated high density and the relation to integration was linear. Catches during the day were also linearly related to integration, but the data indicated that the fish were clustered in isolated schools. At night the fish were uniformly dispersed. Catch and integration data on hake were obtained after corrections for noise. Model number two was used during these trawls. The relation of catch and integration was not linear because over one fish per pulse was calculated.

The authors concluded that when fish density is uniform the relation of fish density and integrated voltage will be linear to a density of exactly one fish per pulse and related to the square of voltage at higher densities. Further, the overall density relation to integrated voltage depends primarily on the number and size of schools encountered rather than on the density of fish within schools.

[9 figures, 15 references]

FTP

Visceral material is separated from shucked clam meats.

2.3  
Finley, Ronald K. (Towson, Md.), Donald J. Langlois (Pasadena, Md.), and Robert H. Nicholson (Lewes, DE 19958): assigns to HCA Food Corp., Baltimore, Md.(pat.) U.S. Patent 3,659,315 (May 2, 1972)

PROCESS OF CLAM EVISCERATION

Item	Freezer trawler Meridian	Factoryship Pos'yet
Length, o.a.	103.1 m.	197.3 m.
Length, w.l.	67.6 m.	--
Length, b.p.	46 m.	82 m.
Breadth	10 m.	4.2 m.
Depth to upper deck	2.2 m.	5.5 m.
Draught	0.8 m.	--
Displacement	5,000 tons	27,000 tons
Deadweight	1,680 tons	--
Main engines	2,300 hp.	9,000 hp.
Maximum speed	16 knots	16 knots
Complement	93	905
Fuel oil	--	000'8
Endurance	--	say 06

[Contains diagrams of the profile and general arrangement of the freezer stern trawler Meridian and the processing base ship Pos'yet.]

EXPLORATORY FISHING FOR THE SUNRAY VENUS CLAM,  
MACROCALLISTA NIMBOSA, IN NORTHWEST FLORIDA

Jolley, John W., Jr. (Florida Department of Natural Resources Marine Research Laboratory, P.O. Drawer F, St. Petersburg, FL 33731)  
State of Florida Department of Natural Resources, Technical Series No. 67, 41 pp. (Jan. 1972)

Exploratory fishing to locate commercially significant beds of the sunray venus clam, *Macrocallista nimbosa* (Solander), and to survey benthic fauna from 68 ft. shoreward was conducted with a 48-in. hydraulic Nantucket clam dredge. Sampling was dependent on mild weather and was usually confined to sandy substrates. One hundred and seventy-three stations were established from the Alabama-Florida boundary line to Cedar Keys with five additional stations in southwest Florida.

The most abundant and frequently caught clam was the sunray venus: 95% were taken in depths of 10 to 40 ft. and the catch was highest at 10 to 15 ft. It was taken predominantly in sandy substrates. Although the areas dredged near Panama City and Cedar Keys yielded smaller catches than those at commercial grounds on Bell Shoal, they warrant further investigation. Offshore investigations in depths of 41-68 ft. showed no evidence of other potentially commercially clam stocks. Paucity of small sunrays (less than 126 mm.) tends to substantiate the hypothesis that subadults may move from inshore to offshore areas.

More than 140 species of fish and invertebrates were identified from catches; faunal associations varied with depth in some areas. Several benthic species were found commonly associated with sunrays, and a predatory relationship is suggested for two species. Results at Cedar Keys indicated that the hydraulic Nantucket dredge should not be used in areas where grass beds are an important part of the environment. [21 figures, 4 tables, 18 references]

WS

AN EXPRESSION FOR THE VARIANCE OF ABUNDANCE ESTIMATES  
USING A FISH ECHO INTEGRATOR

Moose, Paul H. (Marine Acoustics Program, Division of Marine Resources, and Applied Physics Laboratory, University of Washington, Seattle, WA 98195), and John E. Ehrenberg (Department of Electrical Engineering, University of Washington, Seattle, WA 98195)

Journal of the Fisheries Research Board of Canada 28, No. 9, 1293-1301 (Sept. 1971)

A mathematical model of a fish echo integrator was prepared to analyze and determine expressions for variations in performance of the apparatus. Based upon the analysis, procedures for operation of the echo integrator were suggested to obtain optimum estimates of fish density.

[3 figures, 9 references]

WS

Flavor-producing constituents of meat are extracted with water from the practically fat-free comminuted meat. The aqueous solution is subjected to dialysis and chromatographic fractionation to yield the flavor-producing materials. FTP

MEAT FLAVOR CONCENTRATES

Mabrouk, A. F., and J. K. Jarboe; U.S. Department of the Army (pat.)  
U.S. Patent 3,634,097

Food Technology 26, No. 5, 111 (May 1972)



2.43 STORAGE LIFE OF PREPACKED WET FISH AT 0°C.  
I. PLAICE AND HADDOCK

Huss, H. H. (Technological Laboratory, Ministry of Fisheries, Lyngby, Denmark)  
Journal of Food Technology 1, No. 1, 13-19 (Mar. 1972)

These experiments were carried out to determine the effect of packaging on the keeping quality of fish stored at 0°C. Plaice and haddock, not more than 2 to 3 days on ice, were gutted and then individually packed in low-density polyethylene (0.07 mm.) and polyamide (nylon 11) (0.04 mm.) pouches. The pouches were heat sealed and the filled bags were stored in wet ice. The polyamide bags were vacuum packed; the polyethylene bags were packed without vacuum and with vacuum. Some gutted fish were stored in wet ice without wrappers--these fish served as control samples. During periodic intervals of storage, sample bags of fish and samples of the control lot of fish were removed and examined for (1) levels of oxygen and carbon dioxide partial pressure inside the bag (Additional fish samples were packed with 25 ml. of cold, newly boiled water. The oxygen and carbon dioxide partial pressures were determined electro-chemically on the water phase.), (2) total aerobic bacterial count, (3) organoleptic quality, (4) measurement of total volatile base N (TVB), and (5) pH value.

The packaging did not cause any decrease in quality or keeping time of the plaice and haddock stored at 0°C. In some instances, an improvement was noted depending upon the species of fish and on the packaging material and method used. (over)

2.43 STORAGE LIFE OF PREPACKED WET FISH AT 0°C.  
II. TROUT AND HERRING

Hansen, Poul (Technological Laboratory Ministry of Fisheries, Lyngby, Denmark)  
Journal of Food Technology 1, No. 1, 21-26 (Mar. 1972)

Part I of this series, *ibid.* pp. 13-19, deals with plaice and haddock. Tests were carried out to determine the effect of packaging on the keeping quality of these fish stored at 0°C. In this study, trout *Salmo irideus* and herring *Clupea harengus* were used. The fish were taken from the water, gutted, and experimentally packed in 1 day. The gutted trout were packed heads-on; the gutted herring were packed with heads-off. The lots of trout and of herring were packed into four test groups: (1) vacuum packed in airtight films [polyamide (0.04 mm.) or a saran-coated polyester/polyethylene laminate], (2) vacuum packed in polyethylene films (low density, 0.04 or 0.07 mm.), (3) packed in polyethylene films without vacuum, and (4) control--the fish were not packaged. The bags of fish and the unpackaged fish were held in ice (0°C). Water was added to additional samples of prepackaged fish for use in the electrometric measurements of partial pressure of oxygen inside the pouch. Sample pouches of the fish and samples of the control lot of fish were removed during periodic intervals of storage and examined for (1) partial pressure of oxygen inside the pouch, (2) total aerobic bacterial count, (3) peroxide value, and (4) organoleptic quality.

The keeping quality in wet ice of gutted trout and herring packed in pouches depended upon the access of atmospheric air to the surfaces of the fish during storage. The fish packed loosely in polyethylene pouches showed oxidation of fat and rancidity early in the storage period because of easy access of air to the fish. (over)

2.6 ECONOMICS OF SURPLUS HATCHERY SALMON DISPOSAL IN OREGON  
(3.26)(9.2)

Roberts, Kenneth J.  
Commercial Fishing Publication, Sea Grant No. 17, 20 pp. (n.d.) (Oregon State University Extension Marine Advisory Program, Corvallis, OR 97331)

The Fish Commission of Oregon (FCO) has been selling surplus hatchery salmon since 1964. Before 1964 all the salmon that returned to the hatcheries were used for eggs and sperm required to expand the hatchery program. Starting in 1964 more salmon returned to the hatcheries than were needed for egg production. These surplus salmon were sold through bids by the FCO without grading which would restrict the best quality for human consumption. In 1971 surplus salmon were classified in one of three grades. The top two grades were for human consumption and the third for nonhuman consumption.

The FCO has received comments that: (1) surplus hatchery salmon is of poor quality and hurts the market; (2) a public agency should not be in the fish business; (3) surplus hatchery salmon in the market lowers the price of commercially caught salmon.

This study analyzed the marketing of salmon in relation to the complaints and provided the following information. Until 1970 the amount of surplus salmon sold by the FCO and used for human consumption was 4.70% of the commercial catch (assuming that all of it is used for human consumption). In 1971, when the FCO began grading surplus salmon before sale, 2.98% of the commercial catch was used for human consumption. The author observes that such a small proportion of the commercial catch would have a small or no effect on the market price of salmon. With (over)

3.15 RADIATION PRESERVATION OF TROPICAL SHRIMP FOR AMBIENT  
TEMPERATURE STORAGE. I. DEVELOPMENT OF A HEAT-RADIATION  
COMBINATION PROCESS

Savagaon, K. A., V. Venugopal, S. V. Kamat, U. S. Kumta, and A. Sreenivasan (Biochemistry & Food Technology Div., Bhabha Atomic Research Centre, Trombay, Bombay 85, India)  
Journal of Food Science 31, No. 1, 148-150 (Jan.-Feb. 1972)

Earlier work has shown that good quality food products can be preserved by integrating radiation treatment with thermal treatment to inactivate the enzymes, vacuum packaging in suitable containers to arrest oxidative changes, and irradiation at low temperatures to prevent damage to tissue constituents. The cost of food products for general consumer use prepared by this multistep process would appear prohibitive.

In this study, the authors examined alternate low-cost combination treatments using low-dose irradiation (100-300 Krad) and heat treatments that would adequately preserve food products stored at ambient temperatures. To assess the efficacy of the heat-radiation treatment, inoculated pack studies were carried out using Clostridium sporogenes. Polycell pouches (polyethylene 150 gauge/cellophane 100 gauge) were used to package the shrimp.

Three processes were developed. The processes and storage test results are summarized in the following table.

(over)

Sample of shrimp	Processing treatment <sup>2</sup>				Shelf life of treated shrimp at 28°-30° C.
	Method	Heating		Radiation dose	
		Temp. °C.	Time min.		
Control:	1 Steam	100	15	Krad	1-2 days
	2 Steam, pressure	109	20		2-5 days
	3 Steam, pressure	121	8		3-15 days
Test:	1 Steam	100	15	350 200 100	6-8 weeks
	2 Steam, pressure	109	20		6-8 weeks
	3 Steam, pressure	121	8		6-8 weeks

Inoculated pack tests using spores of *C. sporogenes* at 10<sup>2</sup> and 10<sup>6</sup> per g. levels indicated that the product was safe from the bacterial standpoint. The polycell pouches seemed to induce adverse changes in the organoleptic qualities of stored shrimp, so the authors propose the use of packaging material more stable to irradiation treatment. They suggest materials such as nylon-6, polyethylene, polyethylene-terephthalate (PET), and poly(vinyl chloride-vinyl acetate). The third test sample process (with the cooking time of 8 min. at 121° C.) gave a product with better appearance than did the other two products prepared by the other two test procedures. [2 figures, 3 tables, references]

TLF

regard the possibility of poor quality fish in the market for human consumption. In the matter of a public agency not being in the fish business, the public is already in the fish business by providing hatcheries as a fisheries resource. Fish that are surplus to the resource should be disposed of in a manner that will benefit the public. [1 figure, 7 tables]

MS

3.15 DAMAGE TO THE NERVOUS SYSTEM CAUSED BY IRRADIATED FOODS.  
(0.7) THIS IS WHAT ANIMAL TESTS IN FRANKFURT HAVE SHOWN

Steinert, H.  
Handelsblatt Düsseldorf p. 30 (Feb. 17, 1972) (In German)  
BfMIRA Abstracts 25, No. 5, Abstract No. 1697, 344 (May 1972)

Fish marinated were subjected to 160 and 480 Krad and fed to rats. The results indicated that irradiation at these levels could cause damage to the central nervous system of persons consuming the irradiated food. The work was carried out at the Battelle Institute in Frankfurt, G.S.B.  
Reprinted

2.06 COOKED MEAT PRODUCT

Ackroyd, H. B.; Scot Meat Products Ltd. (pat.)  
U.S. Patent 3,638,554  
Food Technology 26, No. 5, 111 (May 1972)

Meat is compressed in an evacuated trough into a unit of the desired cross section. The unit is then slid into a container and cooled while compression is maintained.  
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2.43 REDUCING THE TOXICITY OF FOOD PACKAGING PLASTICS

Petrovskii, K. S., and D. D. Braun (Mosk. Med. Inst. im. Sechenova, Moscow, U.S.S.R.)  
Chemical Abstracts 76, No. 22, 128219q (May 29, 1972)

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[4 figures, 4 references]

The storage life of fish is limited by the rate of oxidative rancidity. Under the conditions described, storage life was about 1 week. The storage life of fish packed in polyethylene films was about twice that of fish packed in polyethylene films without vacuum. A combination of the development of rancidity and of microbiological spoilage limits the storage life of herring and trout vacuum packed in polyethylene pouches and stored in wet ice. Trout vacuum packed in polyethylene bags had a storage life in wet ice of about 3 weeks; those packed in polyethylene bags without vacuum and those packed directly in ice had a storage life of 7 to 10 days. Herring vacuum packed in polyethylene bags had a storage life of 15 days in wet ice; those packed in polyethylene bags without vacuum and those packed directly in wet ice had a storage life of about 9 days.



3.15 RADIATION PRESERVATION OF TROPICAL SHRIMP FOR AMBIENT TEMPERATURE STORAGE. 2. STORAGE STUDIES

Savagaon, K. A., V. Venugopal, S. V. Kamat, U. S. Kumta, and A. Sreenivasan (Biochemistry & Food Technology Div., Bhabha Atomic Research Centre, Trombay, Bombay 85, India)  
Journal of Food Science 37, No. 1, 151-153 (Jan.-Feb. 1972)

In part 1 of this series, the authors described a heat-radiation combination process that preserves shrimp packaged in polycell pouches for 6 to 8 weeks at ambient temperature (28°-30° C.). In this second part, they determined the storage (room temperature) properties of shrimp processed and packaged by the proposed heat-radiation combination method. The effects of processing and storage on the shrimp were evaluated organoleptically; by means of objective tests for trimethylamine (TMA), thiobarbituric acid (TBA), free fatty acids (FFA), total volatile basic nitrogen (TVBN), and peroxides; and by the determinations of total and free amino acids and level of certain vitamins (ascorbic acid, thiamine, riboflavin, and niacin). The proximate composition of the shrimp immediately after processing was: moisture, 70±1%; protein, 25±0.5%; lipids, 1.0±0.1%; and ash, 1.0±0.025%.

TMA and TVBN values in the heat-radiation test samples of shrimp remained constantly low during the period of storage; the values for the unirradiated controls almost doubled after 3-15 days of storage. Moisture loss of the test shrimp samples was about 0.05% per day. Peroxides could not be detected in the cooked-irradiated test samples of shrimp before and after storage. The FFA of the shrimp increased after the irradiation treatment followed by some decrease during storage. Some changes were observed in the TBA content. Reactions of FFA and TBA-reacting substances with proteins and amino acids may lead to discoloration and

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3.331 PHYSICO-CHEMICAL, MICROBIOLOGICAL AND ORGANOLEPTIC INVESTIGATIONS ON STERILIZATION PROCESS OF MACKEREL COLIAS PRODUCT IN ITS OWN LIQUOR

Zięcik, Marian, Mirosław Fik, Olgierd Rzewuski, Anna Fik (Institute for Exploitation of Marine Resources-WSR, ul. Broniewskiego Blok 34, Szczecin, Poland)  
Zeszyty Naukowe 35, Rybactwo Morskie II, 121-134 (1971) (In Polish; summary in English) (Science Notes, Marine Fishery II, Higher School of Agriculture of Szczecinie, Szczecin, Poland)

Tests on mackerel *Scomber colias* canned in its own liquor were performed to determine optimum processing conditions for acceptable organoleptic properties while minimizing undesirable physicochemical and bacterial changes in the product.

The optimum temperature and time range was found to be 112°-120° C. for 70-45 min. Organoleptic properties were acceptable in the product that was processed for the shortest time at the highest temperature. In addition, acceptable pigmentation was found to depend on the shorter processing period. To prevent unacceptable physicochemical and bacterial changes, filled cans waiting sterilization should be held at room temperature no longer than 1½ hr.

Abstract by Jan Walczak modified by SW

[6 tables, 14 references]

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3.9 STABILITY OF INTERMEDIATE MOISTURE FOODS. 1. LIPID OXIDATION (3.60)

Labuza, T. P., L. McNally, Denise Gallagher, J. Hawkes, and F. Hurtado (Department of Nutrition & Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Journal of Food Science 37, No. 1, 154-159 (Jan.-Feb. 1972)

This paper reports on experiments to determine the stability of intermediate moisture food (IMF) systems relative to lipid oxidation. Previous work with model systems on the effect of water and of various liquid humectants showed increased oxidation in the IMF region due to increased catalyst mobility in the larger liquid volume and, also, the higher liquid content caused swelling of the polymetric matrix, thus exposing new catalyst sites. To confirm the results found in model systems, the authors tested actual intermediate moisture foods. The independent effects of water activity and moisture content on lipid oxidation were also examined to determine whether a food is more stable to oxidation if it is on the adsorption branch versus the desorption branch of the isotherms at the same water activity. [According to T. P. Labuza ("Sorption Phenomenon of Foods," Food Technol. 22, 15 (1968)) the sorption isotherm of most foods exhibits a hysteresis loop; thus, depending on the direction of reaching the final water activity, either adsorption by going up the isotherm or desorption by going down from the natural moisture content, IMF systems of similar solids content, the same water activity, but vastly different moisture contents, can be obtained. IMFs are prepared by two

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 9 (over)

3.9 STABILITY OF INTERMEDIATE MOISTURE FOODS. 2. MICROBIOLOGY (0.5)(3.60)

Labuza, T. P., Sally Cassil, and A. J. Sinskey (Department of Nutrition & Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Journal of Food Science 37, No. 1, 160-162 (Jan.-Feb. 1972)

Commercial intermediate moisture food (IMF) systems usually range in water activity ( $a_w$ ) from 0.7 to 0.85 in order to control the growth of any food poisoning organisms yet allow enough water in the food necessary for the plastic mouth feel of the food. Nevertheless, IMFs at this range of water activity are still susceptible to growth of molds and yeast and must contain an added preservative (potassium sorbate or calcium propionate). In the present study an attempt was made to determine if any differences exists with respect to microbial growth for IMF systems prepared by either the adsorption or desorption methods [see part 1 of this series, *J. Food Sci.* 37, No. 1, 154-159 (1972)].

A pork and a banana IMF system were prepared at various  $a_w$  levels by the adsorption and desorption techniques to give foods of the same solids composition and water activity but different moisture contents. These systems were then inoculated with a mold (*Aspergillus niger*), a yeast (*Candida utilis*), a gram-negative bacterium (*Pseudomonas fragi*), and a pathogenic bacterium (*Staphylococcus aureus*). All samples were packed in covered jars and the jars were stored at 25° C.

The minimum growth water activity in IMF systems differed significantly with respect to the method of preparation of the foods (adsorption or desorption techniques). The following table summarizes the minimum growth  $a_w$  in IMF systems.

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3.6 DEHYDRATED WHITE FISH

Ishii, R. (pat.)  
Japanese Patent 37855/71  
Food Technology 26, No. 4, 170 (Apr. 1972)

In this process, the fish are treated with phytic acid.

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[References: 02, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

3.8 PICKLED FISH PRODUCT

Inaba Shokuhin KK (pat.)  
Japanese Patent 36178/71  
Food Technology 26, No. 4, 170 (Apr. 1972)

Slices of trout are coated with starch then fried in edible oil. The fried slices are canned in a white, emulsified seasoning mixture.

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[References: 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

Minimum growth aw of the IMF prepared by:	Desorption method	Adsorption method
Banana IMF	89	0 ~
Mold		
Pork IMF	98	0 ~
Mold		
Yeast	57	0 ~
Pseudomonas	57	0 ~
Staphylococcus	57	0 ~

(09.3)(5.0) 6

3.15 USE OF  $\gamma$ -RADIATION DURING THE PREPARATION OF CANNED FOODS (3.33)

Dutova, E. N., and M. M. Gofarsh (U.S.S.R.)  
Chemical Abstracts 76, No. 7, 32933s (Feb. 14, 1972)

3.15 BIOCHEMICAL CHANGES OF FRESH FISH UNDER THE ACTION OF  $\gamma$ -IRRADIATION

Kardashev, A. V., N. D. Bobrovskaya, L. B. Klyashcorin, and N. V. Maslennikova (U.S.S.R.)  
Chemical Abstracts 76, No. 7, 32954z (Feb. 14, 1972)

[References: 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381





Anonymous  
Norwegian Fishing and Maritime News 19, No. 1, 10, 13, 21 (1972)

This Norwegian floating fish meal and oil factory's without a propulsion engine but can be towed to the desired port or area of operation. When in operation, the compact factoryship will lie at anchor in port and operate as a self-supporting plant. The floating factory is fully equipped to produce fish meal and oil, and includes unloading, loading, and conveying facilities; diesel electric power station; main steam power plant; fresh-water generators; and storage tanks for raw material, fish meal, fish oil, fuel oil, diesel oil, and fresh water. In addition, the floating factory is equipped with air-conditioned cabins, lounges, and galley, and it has complete service for management and production staff of about 20 persons. It also has a production control laboratory. The special advantage of the floating factory is that it can be towed to areas where fish are abundant. Furthermore, local conditions ashore near areas where fish supplies are abundant are not always favorable for the construction of industrial plants--the floating plant would be useful in such locations.

[5 figures, 1 table, 15 references]

law. Moisture or an antioxidant inhibits the rate of oxidation in a manner similar to that for lipid oxidation. The dry samples had much greater rate constants and shorter induction periods than did the humidified samples. The heat of activation for decoloration was calculated from data obtained at 5°, 20°, and 35° C. and was found to be 9.70 Kcal.

5.1 (3.64)(0.34)

## 6.54 WHAT IS THE FUTURE OF TEXTURED PROTEIN PRODUCTS?

Robinson, Radcliffe F. (Food Ingredients, Marschall Div., Miles Laboratories, Inc., Elkhart, IN 46514)  
Food Technology 26, No. 5, 59-60, 62-63 (May 1972)

Textured protein products have a potential market in three areas--industrial, institutional, and "consumer." The industrial use of plant protein granules for extending meat patties, chili, frankfurters, etc. should increase during the next 2 or 3 years. This increase will result from the greater accumulation of knowledge on how to prepare better extended meat products and the acceptance of such products by children in the School Lunch Program.

The institutional market should develop gradually during the next few years. Data are being collected on nutritive value, new recipes for special diets are being prepared, and new formulations for special products are being developed. Such information will promote use of textured protein products in hospitals and in institutions.

The consumer market will have to be developed through a major consumer education program. This educational program will have to emphasize the overall acceptance factors of textured protein products and not their economic advantages. Further, Federal Government cooperation will be required to establish standards of identity for plant protein products and to simplify labeling requirements. FTP

6.54      EXTRUDED MEAT PRODUCT  
(3.9)

Van Werven, F. M., and F. P. Bohlmeier; Unilever Ltd. (pat.)  
Canadian Patent 891,979  
Food Technology 26, No. 5, 111 (May 1972)

Shaped fish (or meat) pastes suitable for canning, freezing, or drying are  
made. FTP

*Turbinaria ornata* grows to a maximum size from October to December. No marked changes were noted in the yield of alginic acid from the alga. The amount of mannitol was high in the early stages of the growth cycle; however, the amount of mannitol decreased when growth of the plant was maximum and the number of fruiting plants in the population was abundant.

CHANGES IN MANNITOL AND ALGINIC ACID CONTENTS  
OF *TURBINARIA ORNATA* (TURNER) J. AGARDH IN RELATION  
TO GROWTH AND FRUITING

Rao, M. Umamaheswara, and S. Kalimuthu (Central Marine Fisheries Research Institute, Regional Centre, Mandapam Camp, India)  
*Botanica Marina* 15, No. 1, 57-59 (Mar. 1972) (Walter de Gruyter Inc., 162 Fifth Ave., New York, NY 10010)

#### 4.2 STUDIES ON THE RELATIONSHIP BETWEEN THE NUTRITIVE VALUE AND THE STRUCTURE OF POLYMERIZED OILS.

Ohfuchi, Takehiko, Shigeo Chiba, and Takashi Kaneda (Department of Food Chemistry, Faculty of Agriculture, Tohoku University, Tsutsumi-dōri, Amamiya-cho, Sendai, Japan)

Journal of the Japan Oil Chemists' Society **21**, No. 2, 27-30 (79-82) (Feb. 1972)  
(In Japanese; figures, tables, and summary in English)

Tests were performed to determine presence of dimers of glycerides used in cooking fats and oils. No dimers were found. In another experiment a small amount of dimer was found in sesame oil and in margarine containing fats of animal origin. [6 figures, 3 tables, 3 references] SW

MS

A toxic dimer of glycerides was previously found in thermally oxidized oil. A survey was made for its presence in used frying oils. Samples of used oil were collected from food manufacturers which use frying oils. Trace amounts of toxic compound were found in most oils except rapeseed oil used to fry bean curds (1.5%) and soybean oil used to cook fish balls (0.6%). Weight gain of rats fed these oils decreased with the increase of toxic compounds.

[10 figures, 6 tables, 3 references] SW

VIII. PRESENCE OF TOXIC DIMER GLYCERIDES IN USED FRYING OILS  
(4,52)

Ohfuji, Takehiko, Harumi Igarashi, and Takashi Kaneda  
Journal of the Japan Oil Chemists' Society 21, No. 2, 21-26 (73-78) (Feb. 1974)  
(In Japanese; figures, tables, and summary in English)

#### 4.2 STUDIES ON THE RELATIONSHIP BETWEEN THE NUTRITIVE VALUE



6.54 WHAT ARE TEXTURED PROTEIN PRODUCTS?

Lockmiller, N. R. (Special Products Department, A. E. Staley Manufacturing Co., 2200 East Eldorado Street, Decatur, IL 62525)  
Food Technology 26, No. 5, 56, 58 (May 1972)

Textured protein products, primarily those prepared from soybeans, are described. There are two main types of textured protein products, the expanded vegetable proteins and the spun vegetable proteins.

The expanded vegetable proteins are made by cooking and extruding into bite-size particles a mixture of [soy] flour and flavoring and coloring materials. The spun vegetable proteins are made from vegetable protein isolates; the isolates are treated with alkali and the treated protein is spun into fibers which are then formed into bundles. The bundles are tied together and treated with a binding solution, then with a flavoring and coloring solution.

The Food and Nutrition Service of the U.S. Department of Agriculture has authorized the use of textured vegetable protein fortified with minerals and vitamins in lunches and suppers served under the Child Feeding Program (Type A School Lunch). The USDA specifications for textured protein products for use in the School Lunch Program are shown in the table that follows.

(over)

7.591 POSTMORTEM CHANGES IN THE GLYCOGEN PHOSPHORYLASE ACTIVITY  
(0.38) OF THE MUSCLE OF WHITE SUCKER (CATOSTOMUS COMMERSONI) AND  
NORTHERN PIKE (ESOX LUCIUS)

Manohar, S. V., and Helen Boese (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba, Canada)  
Journal of the Fisheries Research Board of Canada 28, No. 9, 1325-1326 (Sept. 1971)

Results of earlier work indicated that postmortem degradation of glycogen in northern pike was slower than that in white sucker. Further experiments were performed to find the relation of glycogen phosphorylase to the degradation of glycogen.

Glycogen phosphorylase exists in "a" and "b" forms. The "a" form is enzymatically active and the "b" form is inactive. Phosphorylase "b" becomes active in the presence of adenosine monophosphate (AMP). Measurements of glycogen content and phosphorylase activity were made on muscle of fish killed the same day and on the muscle from the same fish after 7 days' storage on ice.

Since the phosphorylase activity in the muscle of sucker and pike was determined in the presence, and absence, of AMP then the total activity of "a" plus "b" forms will have been measured. After 7 days, activity of phosphorylase without added AMP increased slightly in sucker muscle and decreased significantly in pike muscle. The activity of phosphorylase with added AMP was much higher in muscle of both species than without added AMP. These results indicate that most of the phosphorylase in the muscle was the normally inactive "b" form that had been activated by addition of AMP. Further, a significant amount of glycogen remained in the pike muscle. The authors suggest that incomplete degradation of glycogen in the pike muscle is due to a decreasing amount of phosphorylase "a."

[8 references] SW

7.81

AN INVESTIGATION OF THE METHOD OF DETERMINING TRIMETHYLAMINE  
IN FISH MUSCLE EXTRACTS BY THE FORMATION OF ITS PICRATE SALT--  
PART I.

Murray, C. K., and D. M. Gibson (Department of Trade and Industry, Torry Research Station, Aberdeen, Scotland)  
Journal of Food Technology 7, No. 1, 35-46 (Mar. 1972)

P. L. Hoogland's modification [Circ. Fish. Res. Bd Can. No. 3 (1956)] of W. J. Dyer's picric acid procedure for determining trimethylamine (TMA) in fish muscle extracts [J. Fish. Res. Bd Can. 6, 351 (1945)] was examined as to its usefulness as a routine method and the results are compared to those obtained on the same sample using the microdiffusion method (Conway). In the picrate method, the TMA is volatilized into a toluene phase to which picric acid is added. Then the ionization of the picrate salt is measured photometrically. In the microdiffusion technique, the TMA is volatilized, trapped in acidic buffer, and then measured by titration.

Hoogland's procedure for determining trimethylamine in fish muscle was modified to improve (1) the stability of the fish muscle extract, (2) the accuracy of the results, and (3) the reproducibility of the results when the method is used routinely on a large number of samples. The modifications proposed are: (1) 100 g. of fish muscle are blended with 300 ml. of 5.0% trichloroacetic acid instead of with water; (2) potassium hydroxide (45% is used instead of K<sub>2</sub>CO<sub>3</sub> (50%); (3) the spectrophotometer readings are made at 410 nm instead of at 420 nm. (over)

7.81 AN INVESTIGATION OF THE METHOD OF DETERMINING TRIMETHYLAMINE  
IN FISH MUSCLE EXTRACTS BY THE FORMATION OF ITS PICRATE SALT--  
PART II.

Murray, C. K., and D. M. Gibson (Department of Trade and Industry, Torry Research Station, Aberdeen, Scotland)  
Journal of Food Technology 7, No. 1, 47-51 (Mar. 1972)

In part I of this series, *ibid.* pp. 35-46, it was found that use of potassium hydroxide is superior to the use of potassium carbonate in the picric acid colorimetric method for the estimation of trimethylamine (TMA) in iced fish. The difference in results obtained when each of the two alkalis are used is small when the method is applied to iced fish. However, when the method is applied to fish that are or have been frozen, use of potassium carbonate as the alkali gives higher values for TMA than does use of potassium hydroxide. Apparently, some volatile basic compound other than TMA is being measured.

In this study, thin-layer chromatography, gas-liquid chromatography, and colorimetric procedures were used to identify and determine the amines present in the standard solutions, extracts of cod muscle, and in the toluene phase of a modified TMA procedure.

The differences in TMA-nitrogen values found for cod muscle using KOH and K<sub>2</sub>CO<sub>3</sub> as the alkali in the picric acid procedure was due to the interference by dimethylamine (DMA) in the analysis. The difference is larger in frozen fish (over)

Meiselman, Herbert L. (U.S. Army Natick Laboratories, Natick, Mass.)  
Critical Reviews in Food Technology 3, No. 1, 89-119 (1972)

This article is a survey and critical review of recent research on human taste perception. It includes the following subjects.

Taste qualities: Electrophysiological literature with assessment of single papilla stimulation, cross adaptation, taste quality modifiers, stimulus classes, methodological considerations in quality research, techniques of multidimensional scaling (which deal with variables that account for the variability in a system), anesthetics, and use of clinical material;

Basic taste psychophysics: Taste thresholds, and taste scales;  
Human taste research procedures: Choice of subjects in human taste research, choice and calibration of stimuli, stimulus delivery, and relevance of human taste research procedures;

Sensory adaptation: Course of gustatory adaptation, and effects of taste adaptation;

Taste mixtures: Mixtures of the same taste, and mixtures of different tastes. [2 figures, 17 tables, 78 references]

DLJ [See references 11, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

Trommsdorff, H.  
2. Lebensmittelunters.-u.-Forsch. 147, No. 3, 133-139 (1971) (In German; English summary)

BEMIRA Abstracts 25, No. 2, Abstract No. 442, 92 (Feb. 1972)

In assessing the suitability of the free amino acid content as a criterion of fish quality it was found that the amounts of only a few amino acids alter sufficiently for this purpose. It was demonstrated that different bacteria influence the decomposition of fish protein in different ways. C.S.B. Reprinted

7.89 APPLICATION OF ION-EXCHANGE CHROMATOGRAPHY OF AMINO ACIDS FOR THE QUALITY EVALUATION OF FISH

DLJ [See references 11, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

because greater quantities of DMA can be formed in frozen fish. Thus, DMA might be a useful index of quality in frozen fish. These results apply to cod muscle; further work is needed to determine the extent of DMA interference in the TMA-nitrogen values of other species of fish.

6.54 FISH PROTEIN CONCENTRATE

Lee, C. Y.; Pennwalt Corp. (pat.)  
Canadian Patent 891,977  
Food Technology 26, No. 5, 111 (May 1972).

n-Butanol is used as a defatting and dehydrating agent in the production of odorless and tasteless fish protein concentrates.

DLJ [See references 11, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365,



Grice, George D., George R. Harvey, Vaughan T. Bowen, and Richard H. Backus (Woods Hole Oceanographic Institution, Woods Hole, MA 02543)  
Bulletin of Environmental Contamination and Toxicology 1, No. 2/3, 125-132 (Feb.-Mar. 1972)

The staff at the Woods Hole Oceanographic Institution have undertaken a program to determine the levels of a variety of pollutants in samples from the open Atlantic Ocean. However, collection of authentic uncontaminated samples is difficult because the ocean-going vessel is an abundant source of the same pollutants (petroleum hydrocarbons, pesticides, trace metals) present in open-ocean organisms. Sources of contamination from a ship (including the research vessel) include (1) discharged bilge water, (2) discharge of the septic tank, (3) dumped garbage, debris, or engine room waste, (4) cleaning discharge of the vessel's boilers and tubes, and (5) discharge of paint chips.

In this article, the authors describe the procedures they have adopted for the collection and preservation of open ocean marine organisms for pollutant analysis.

The following general precautions for collecting samples are suggested: (1) The retrieved samples must be handled carefully, and quickly transferred to the containers in which they will be preserved. (2) The specimens must never come in contact with the ship; the collecting gear should touch the ship as little as possible. (3) The samples and gear should not be washed with the ship's salt water. (over)

Hesselberg, R. J., and J. L. Johnson (U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Fish-Pesticide Research Laboratory, Columbia, MO 65201)  
Bulletin of Environmental Contamination and Toxicology 1, No. 2/3, 115-120 (Feb.-Mar. 1972)

A new column extraction procedure was developed for separating pesticides from fish, fish food, and mud samples. The procedure is efficient, fast, and inexpensive. The extraction, filtration, and drying can be combined in one operation.

Recoveries of organochlorine insecticides from spiked fish and fish food was good, in the range of from 96 to 100%. The recovery precision showed generally less than 3% variation between successive samples. The organophosphorus insecticide parathion was quantitatively recovered from fish samples by use of a mixture of 10% diethyl ether in petroleum ether for the extracting solvent. Recoveries of simazine and 2,4-D (dimethylamine salt) from fish ranged from 95 to 99%. The recovery of simazine-spiked mud gave only an 83% recovery. [1 figure, 3 tables, 10 references]

FTP

Crane, Frank M., Mike Hansen, Ralph Yoder, Ken Lepley, and Pat Cox (Land O'Lakes Inc., Ft. Dodge, IA 50501)  
Feedstuffs 44, No. 24, 34-36 (June 12, 1972)

Based on this review of the literature on the occurrence of *Salmonella* microorganisms in feeds and feed ingredients and on some work carried out at the authors' laboratory, it appears that animal protein sources are the significant sources of salmonella organisms. Feed manufacturers reported a high incidence of salmonella contamination of meat meal and of poultry byproducts meal; fish meal and feather meal showed fewer incidences of contamination and contamination of grains was considered negligible. Recent data collected by the U.S. Department of Agriculture are shown in the table that follows.

The opinion was expressed that presence of salmonella in feed ingredients other than animal protein material is due almost entirely to contamination from animal protein sources. Two steps can be taken to resolve the problem. One step

Feed items	Number of samples examined for <i>Salmonella</i> organisms	Percent of samples found to be contaminated
Animal byproducts	869	31.1
Poultry feed	1,605	5.2
Fish meal	805	4.7
Swine feeds	1,567	3.1
Oilseed meals	2,629	2.3
Cattle feed	2,597	0.9
Grains	2,698	0.7
Total	12,770	--

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 15 (over)

Barrett, Barney B., Johnnie W. Tarver, Walter R. Latapie, Judd F. Pollard, Woodrow R. Mock, Gerald B. Adkins, Wilson J. Gaidry, Charles J. White, and James S. Mathis  
Louisiana Wildlife and Fisheries Commission, New Orleans, La. (1971), 191 pp.  
(Price was not indicated)

Hydrology and Sedimentology of coastal Louisiana are two phases of a four-phase, multi-state project--the Cooperative Gulf of Mexico Estuarine Inventory and Study (GMEI)--undertaken jointly by the Louisiana Wildlife and Fisheries Commission, the Alabama Department of Conservation, the Mississippi Marine Conservation Commission through the Gulf Coast Research Laboratory, and the U.S. Department of Commerce, NOAA, National Marine Fisheries Service, St. Petersburg Biological Laboratory for the west coast of Florida and the Galveston Biological Laboratory for Texas. The other two phases of the undertaking, Area Description and Biology, are covered in detail in a report published by the commission earlier this year.

The primary purpose of this work is to present the hydrological and sedimentological data obtained in coastal Louisiana during the GMEI project.

Louisiana's estuaries from Sabine Lake to the Pearl River were sampled at 109 stations during 1968 and 1969. Salinity and water temperature were measured at all stations; dissolved oxygen, turbidity, and the nutrients nitrate, nitrite, inorganic phosphate, and total phosphorus were sampled at 82 stations. Tide, barometric pressure, rainfall and wind speed and direction were measured at one station. (over)

pertinent references cited was "Control of Salmonella in Fish Meal," by B. J. Carroll and B. Q. Ward, FIR Reprint, Fishery Industrial Research 4, No. 1, 29-36 (1967), a publication of the Bureau of Commercial Fisheries.

would be to eliminate animal protein materials from the feeds. Although this would be feasible from the nutritional standpoint, it would not be economical or practical. The other step would be to pellet or granulate all livestock feeds. Data presented in this report indicate that salmonella are destroyed in the process of

Gulland, John A. (Fisheries Department, Food and Agriculture Organization of the United Nations, Rome, Italy)

This book is a collection of lectures delivered by the author at the University of Washington during the fall of 1971. The series describe the major world fisheries and the changes taking place as a result of large-scale fishing operations. The application of fish population dynamics for the rational management of the fisheries resources is also described.

Coastwide data on air temperature, precipitation, and stages and discharges of the principal rivers were also collected.

In general Louisiana's estuaries and near offshore waters are low in salinity and high in nutrient concentrations as compared with other states bordering the northern Gulf of Mexico. These characteristics are due primarily to Louisiana's high rainfall and the large volume of river water which makes its way through rich alluvial soils to the Gulf of Mexico. The major contributors of nutrients to the estuaries are the Mississippi and Atchafalaya Rivers. These rivers are also responsible for major salt water dilutions within the coastal area and in the near offshore waters.

[Extract from authors' Introduction ad Abstract]

9.1 (1.0117)

Partmann, W.  
J. Texture Studies 2, No. 3, 328-338 (1971).  
BFMKA Abstracts 25, No. 2, Abstract No. 504, 106 (Feb. 1972).

Reprinted

(4) The operators' hands, the tools, the sorting trays, and the storage containers should be liberally washed with pharmaceutical grade (95%) ethanol. (The ethanol should be that prepared by ethylene hydration.) (5) The handling and sorting gear must be of metal, of glass, or enameled. (6) The samples must be preserved at temperatures from  $-10^{\circ}$  to  $-20^{\circ}$  C. and must be held in glass or metal containers (glass screwcap jars may be used only if the under-cap liners are made of washed aluminum foil). Special precautions are described for collecting and preserving plankton, large organisms, benthic organisms, and sediment.

Rödel, W., and L. Leistner  
Fleischwirtschaft 51, No. 12, 1800-1802 (1971) (In German)  
BFMIRA Abstracts 25, No. 3, Abstract No. 715, 147 (Mar. 1972)

[8 figures, 9 references]

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7.9 (9 19) SOME SEPARATION CHARACTERISTICS OF AN OV-101/OV-210 COLUMN FOR ORGANOCHLORINATED PESTICIDES WITH PARTICULAR REFERENCE TO THE SEPARATION OF PHOTOENDRIN AND ENDRIN



Purdom, Colin E. (Fisheries Laboratory, Lowestoft, Suffolk, England)  
Ministry of Agriculture, Fisheries and Food, Laboratory Leaflet (New Series) No. 25, 17 pp. (Mar. 1972)

Genetic techniques in use in agriculture are applicable to fish culture, but their use should be based on genetic and economic grounds and not on a rule-of-thumb approach. In selection work especially, clear objectives and some knowledge of the genetic basis of variation are essential. Hybridization is a useful tool in fish farming and should be used rationally to combine desirable features of two or more species. Hybrid vigor may be an attribute in species or generic crosses, but it is not a general phenomenon of hybridization in fish, and its biological basis is not understood. New ways of manipulating chromosomes are being developed. Gynogenesis (A form of parthenogenesis reproduction without fertilization) promises to be a rapid way of producing inbred lines, and similar techniques can be used to create artificial polyploids (fish with more than two sets of chromosomes). Triploids can be useful because growth rates tend to be greater than equivalent diploids (normal individuals with two sets of chromosomes) and because they are usually sterile, energy is used for growth rather than in sexual maturation. Tetraploids have not yet been produced, but if appropriate methods can be devised they could provide powerful tools for the manipulation of genetic material.

[8 figures, 2 tables, 1 plate]

SW

## 9.11 ENRICHMENT OF HEAVY METALS AND ORGANIC COMPOUNDS IN THE SURFACE MICROLAYER OF NARRAGANSETT BAY, RHODE ISLAND (9.19)

Duce, Robert A., James G. Quinn (Graduate School of Oceanography, University of Rhode Island, Kingston, RH 02881), Charles E. Olney, Stephen R. Piotrowicz, Barbara J. Ray, and Terry L. Wade  
Science 176, No. 4031, 161-163 (Apr. 14, 1972)

Earlier work [W. D. Garrett, Deep-Sea Res. 14, 221 (1967) and P. M. Williams, *ibid* p. 791] demonstrated the presence of a variety of surface-active materials (e.g., fatty acids and fatty alcohols) at the surface microlayer of the ocean. The major source of these surface-active compounds in the open ocean is the reservoir of natural marine organic matter in the mixed layer. Many pollutants, especially lipophilic pollutants such as chlorinated hydrocarbons and petroleum hydrocarbons, may be concentrated and stabilized in this layer after its formation. Also, trace metals may be concentrated in the microlayer. Organic substances (acids, proteinaceous materials, and other surface-active substances) may furnish complexing sites for heavy metals and thereby be responsible for the transportation and concentration of these heavy metals at the surface of the water.

This article describes the authors' work on the distribution of fatty acids, hydrocarbons, chlorinated hydrocarbons, and trace metals (Pb, Fe, Cu, Ni) in the surface microlayer (top 100 to 150 micrometers) and the subsurface water (20 centimeters below the surface) samples from Narragansett Bay, R.I.

The levels of lead, iron, copper, and nickel in the surface microlayer samples of the water were 1.5 to 50 times the levels in the subsurface samples. This enrichment of trace metals appeared in the particulate and organic fractions of the

(over)

## GROWTH PER MOULT OF TAGGED LOBSTERS (*HOMARUS AMERICANUS*) IN BONAIVISTA BAY, NEWFOUNDLAND

Ennis, G. P. (Biological Station, Fisheries Research Board of Canada, St. John's, Newfoundland, Canada)  
Journal of the Fisheries Research Board of Canada 29, No. 2, 143-148 (Feb. 1972)

Most of the information already collected on the growth of the American lobster was obtained with the use of a marking technique in which holes are punched or bored in various parts of the tail fan of the lobster. In this study two tagging techniques were used to obtain growth data on lobsters in nature: the first involved the ferromagnetic tag [K. B. Jefferts, P. K. Bergam, and H. F. Fiscus, *Nature* 198, 460-462 (1963)] and the second, the sphyrion tag [D. J. Scarratt, J. Fish. Res. Bd Canada 27, 257-264 (1970)]. Lobster growth data obtained by use of the two tags were compared, and data on the use of the sphyrion tag was presented in some detail.

Comparison of growth data of lobsters in nature obtained from ferromagnetic tags and from sphyrion tags during the years 1967 to 1969 showed no difference in growth with one exception, for female sphyrion-tagged lobsters there was a slight difference ( $P = 0.042$ ) between 1968 and 1969. Data are given on carapace length and total weight increments on molting and on incidence of molting of lobsters tagged with sphyrion tags.

[3 figures, 3 tables, 19 references]

FTP

## 9.15 INFECTIOUS PANCREATIC NECROSIS OF SALMONIDS IN ONTARIO (0.5)

Sonstegard, R. A., and L. A. McDermott (Department of Microbiology, University of Guelph, Guelph, Ontario, Canada)  
Journal of the Fisheries Research Board of Canada 28, No. 9, 1350-1354 (Sept. 1971)

Organs and feces of 2,400 fish in six hatcheries were examined for infectious pancreatic necrosis (IPN). The fish included 1,400 brook trout (*Salvelinus fontinalis*), 707 lake trout (*S. namaycush*), 84 splake (*S. fontinalis* x *S. namaycush*), and 250 rainbow trout (*Salmo gairdneri*). Their ages ranged up to 12 years. Examinations conducted between November 1968 and February 1969 at five hatcheries detected no IPN. In March 1969, IPN virus was detected in brook trout yearlings at a sixth hatchery. In April 1969, examination of random samples of brook trout, which were parent fish of the yearlings, detected IPN virus. (The parent brook trout were located at one of the five hatcheries where no IPN virus was detected between November 1968 and February 1969.) At the same hatchery, in December 1970, IPN virus was detected in all brook trout brood stock.

No history of abnormal mortalities was reported from hatcheries where IPN virus had been detected. The virus had little effect on brook trout in these hatcheries but caused 40% mortality when inoculated into brook trout from another source. [1 table, 5 references]



surface microlayer, but did not appear in the inorganic fraction. The authors estimate that if these substances are concentrated in films only a few molecular layers thick on the surface of the water, the actual enrichment factor in the films may be well over  $10^4$ , thus resulting in extremely high localized pollutant concentrations in the surface microlayer.

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[1 table, 8 references]

# CADMIUM POISONING IN FUNDULUS HETEROCILITUS (PISCES: CYPRINODONTIDAE) AND OTHER MARINE ORGANISMS

Eisler, Ronald (U.S. Environmental Protection Agency, National Marine Water Quality Laboratory, West Kingston, RH 02892)

Journal of the Fisheries Research Board of Canada 28, No. 9, 1225-1234 (Sept. 1971)

Available evidence indicates that: (1) cadmium is not biologically essential, (2) cadmium is toxic to humans, (3) a major source of cadmium in the human diet is seafood, and (4) cadmium is found in wastes from industrial and other sources discharged into estuarine environments. For these reasons the effects of cadmium on marine organisms was investigated.

Species of annelids, crustaceans, echinoderms, molluscs, and a teleost (mummichog) were subjected to various levels of  $CdCl_2 \cdot 2\frac{1}{2} H_2O$  to determine toxicity of  $Cd^{2+}$  at 20° C., and 20‰ salinity in 96 hr. Concentrations fatal to 50% of the organisms ranged between 0.32 and 55.0 mg/liter  $Cd^{2+}$ . The most sensitive was sand shrimp (*Crangon septemspinosa*) (0.32) and the most resistant was mummichog (*Fundulus heteroclitus*) (55.0). Mummichogs were more susceptible to cadmium at 20° C. and 5‰ salinity than at 5° C. and salinities of 15, 25, or 35‰. Additional studies with mummichog indicated that 96 hr. was not sufficient to evaluate toxicity of cadmium for this species. Mummichog whole body cadmium residues determined by atomic absorption, provided a useful index of cadmium body burden among surviving fish. Dead mummichogs accumulated more cadmium than living animals: cadmium data from this source should be interpreted with extreme caution. Levels as low as 0.1 mg  $Cd^{2+}$  per liter of medium are potentially harmful to mummichogs and probably other marine species.

[3 figures; 5 tables, 28 references]

WS

## FREEZING RESISTANCE IN POLAR FISHES

Hargens, Alan R. (Physiological Research Laboratory, Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA 92037)

Science 176, No. 4034, 181-184 (Apr. 1972)

The purpose of this study was to compare the freezing resistance in arctic and antarctic fishes to help in the understanding of the freeze-resistance properties of their blood. Six species of fish were used in the tests. *Eleginus gracilis* living in -1.8° C. ice-covered sea water (and *Myoxocephalus scorpioides*) (living in -1.4° C. ice-covered sea water) were obtained at a depth of 2 m. near Nunivak Island, Alaska. *Notothenia coriiceps* and *N. gibberifrons* (living in sea water at 2° C.) were caught near shore at Anvers Island, Antarctica. *Chaenocephalus aceratus* and *Pseudochaenichthys georgianus*, hemoglobin-free icefishes (living in 2° C. sea water) were caught in deeper waters off Anvers Island. Plasma equilibrium melting points, equilibrium freezing points, temperature of initial ice propagation, colloid osmotic pressure, protein concentration, and rates of ice formation, were determined.

The author found that arctic and antarctic fishes, in contact with sea ice at -1.1 to -1.6° C., have plasma equilibrium freezing points which are dependent on salt concentrations. Salt concentrations in sea water are dependent on salinity. The author stated that arctic fishes living in sea water at -1.4° C. have higher supercooling points than antarctic fishes living in sea water at -1.8° C. The author suggested that the higher supercooling points of the antarctic fishes may be due to the higher protein concentrations in their blood. The author also suggested that the higher protein concentrations in the blood of the antarctic fishes may be due to the higher protein concentrations in the blood of the antarctic fishes.

[see references for details of ice crystal growth and ice crystal growth rates]

FTP

## DIFFERENCES IN ATLANTIC SALMON, *SALMO SALAR*, FROM NORTH AMERICA AND EUROPE

Nyman, O. L., and J. H. C. Pippy (Biological Board of Canada, St. John's, Newfoundland, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 2, 179-185 (Feb. 1972)

North American and European Atlantic salmon caught at sea were identified by differences in the electropherograms produced by their serum proteins and liver esterases. The results obtained support the suggestion that salmon from North America and from Europe represent different subspecies.

[8 figures, 3 tables, 28 references]

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[3 figures, 3 tables, 12 references]

## BIOLOGY OF ROCK CRAB (*CANCER IRROBORATUS*) IN NORTHUMBERLAND STRAIT

Scarratt, D. J., and Robert Lowe (Biological Station, Fisheries Research Board of Canada, St. Andrews, New Brunswick, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 2, 161-166 (Feb. 1972)

This paper reports some observations on the biology, population structure, and ecological relation with lobsters of the rock crab in Kouchibouguac Bay, N.B., Canada. Information is given on numbers, size distribution, and sex ratio; growth; maturity and breeding; larval abundance and distribution; stomach contents; ecological relationship with the lobster; and possible effects of a crab fishery.







9.16 (2.08)

farmed plaice. In one test of the farmed fish stored in ice, it was found that gutted fish tasted differently from ungutted fish. The authors recommended, therefore, that farmed plaice be gutted at harvesting rather than at a later stage in the marketing process. The authors indicate that the overall results apply to the particular stocks of fish that were examined.

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[2 tables, 16 references]

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[1 figure, 1 table, 8 references]

The author found that sablefish *Anoplopoma fimbria* were easy to farm. Second-year juvenile sablefish, weighing about 300 g., were captured then reared in fiberglass tanks to about 4 kg. in weight. Under growth-favoring conditions, the sablefish gained about 150 g. g. per fish per month; they used about 5 kg. (wet weight) of feed per kilogram of weight gained; and they showed mortalities of less than 1% per month. In crowding experiments, it was found that concentrations of at least 43 kg. of fish/m<sup>2</sup> (or 70 g./liter) did not adversely affect growth or mortality of the sablefish. The author suggests that possibly a new industry could be based on capture of second-year juvenile sablefish and rearing them to a marketable size.

Journal of the Fisheries Research Board of Canada **29**, No. 2, 207-210 (Feb. 1972)

Kennedy, W. A. (Biological Station, Fisheries Research Board of Canada, Nanaimo, British Columbia, Canada)

Journal of the Fisheries Research Board of Canada **29**, No. 2, 207-210 (Feb. 1972)

9.16  
PRELIMINARY STUDY OF SABLEFISH CULTURE, A POTENTIAL  
NEW INDUSTRY

ESTIMATE OF THE WORLD BUDGET OF FALLOUT SILVER NUCLIDES

Hodge, V. F., and T. R. Folsom (Scripps Institution of Oceanography, La Jolla, CA

92037)

Nature **237**, No. 5350, 98-99 (May 12, 1972)

Silver iodide is used in cloud-seeding experiments. Information on the ecological fate of fallout silver is needed because of interest in the behavior of silver in the marine environment. Recently, R. Grismore, T. R. Folsom, V. F. Hodge, and D. R. Young [Trans. New York Acad. Sci. (in press)] estimated the minimum budget of <sup>110m</sup>Ag over the surface layers of the northern hemisphere created during nuclear weapons testing during 1961-62. They made the estimate on the basis of the concentration of <sup>110m</sup>Ag in the livers of nine fish caught in the North Pacific in 1965 and by the use of various assumptions. These assumptions were: a concentration factor for silver in the tuna fish livers over sea water of 500,000; a volume of the top 100 m. of the North Pacific of  $7.1 \times 10^{18}$  l.; and the total area of the northern hemisphere of  $2.55 \times 10^8$  km<sup>2</sup>. The computed estimated budget of <sup>110m</sup>Ag over the surface layers of the northern hemisphere in 1962 was at least 100,000 Ci.

In this article, an entirely independent approximation of the <sup>110m</sup>Ag budget was made from the ratios of reported concentrations of fallout <sup>90</sup>Sr and <sup>110m</sup>Ag in 60 air filters [H. W. Feely, J. P. Friend, R. J. Lagomarsino, D. C. Bogen, P. E. Biscaye, and J. E. Hardaway, U.S. Atomic Energy Comm. Health and Safety Lab. Rep., HASL-168, 197 (1966)] collected at high altitudes over the northern hemisphere during July to December 1965. This estimate was 100,000 Ci. Further work is continuing at the Scripps Institution of Oceanography to determine the world budget of the long-lived (127 yr.) <sup>108m</sup>Ag.

[1 figure, 1 table, 7 references]

FTP

9.19 INTERNATIONAL CONGRESS ON INDUSTRIAL WASTE WATER

Göranson, B. [Symposium editor]

[Various authors and subjects listed below]

Pure and Applied Chemistry **29**, Nos. 1-3, 1-492 (1972)

This issue of the journal contains the plenary and main technical lectures presented at the International Congress on Industrial Waste Water held in Stockholm, Sweden, on 2-6 November 1970. Pertinent articles of interest to the fisheries are as follows:

"Wirtschaftliche Aspekte beim Kampf der Industrie gegen die Gewässer-verschmutzung" [Economics of water pollution abatement in industry] by W. Gässler (Bundesverband der Deutschen Industrie E.V., Postschliessfach 5 Köln 51, West Germany), pp. 1-9 (In German)

"Waste Water Investigation in Plants," by L. Bruneau (Swedish Pollution Control Company, Drottning Kristinas Väg 47D, S-11428, Stockholm, Sweden), pp. 11-18. [4 figures]

"Methods and Techniques of Continuous Measurement of Water Quality in Rivers, Effluents and Purification Plants," by W. Husmann (Ahornzweig 1, 43 Essen-Stadtwald, West Germany), pp. 19-46. [20 figures, 2 references]

"Measures Taken Against Water Pollution in the Food Processing Industry," by L. C. Gilde (Campbell Soup Co., Campbell Place, Camden, NJ 08066), pp. 143-162. [13 figures, 4 tables, 9 references]

"Waste Disposal in the Meat Industry (A Comprehensive Review of Practice in the United States)," by A. J. Steffen (Purdue University, School of Engineering, Lafayette, IN 47907), pp. 173-190. [6 figures, 2 tables, 29 references]

The other 25 articles deal with water pollution control in the petroleum, chemical, food, iron and steel, pulp and paper, coal mining, tanning, and fermentation industries.

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9.19 THE EFFECT OF PHENYLMERCURIC ACETATE UPON THE FREQUENCY OF HATCHING OF EGGS FROM THE ZEBRAFISH

Kihlstrom, J. E., and L. Hulth (Institute of Zoophysiology, Uppsala, Sweden)

Bulletin of Environmental Contamination and Toxicology **1**, No. 2/3, 111-114 (Feb.-Mar. 1972)

Does the presence of mercury compounds in natural waters affect the reproduction of aquatic animals? To help answer this question, a study was made of the effect of phenylmercuric acetate upon the frequency of hatching and the time required for development of eggs of zebrafishes. About 400 sexually mature zebrafishes were distributed among 13 experimental groups. Each group was kept in 30-liter polyethylene containers under laboratory conditions. The zebrafish eggs were collected daily and treated in accordance with the experimental conditions. The treated eggs were exposed to aerated water containing 10, 20, or 50 ng of phenylmercuric acetate per g. (these concentrations correspond to  $3.0 \times 10^{-8}$ ,  $6.0 \times 10^{-8}$ , and  $1.5 \times 10^{-7}$  M-solutions, respectively). The eggs were kept at  $27 \pm 0.5^\circ \text{C}$ .

The frequency of hatching of the eggs was significantly higher in water containing 10 ng phenylmercuric acetate per g. than in the controls (containing no added phenylmercuric acetate). The frequency of hatching of the eggs exposed to 20 ng of phenylmercuric acetate per g. of water was the same as that of the controls. None of the zebrafish eggs survived exposure to water containing 50 ng of phenylmercuric acetate per g. The increased hatchability of the eggs exposed to water containing 10 ng of the phenylmercuric acetate per g. may have been due to the bactericidal and fungicidal activity of the chemical on the aquatic microorganisms. However, the authors suspect that low concentrations of mercuric compounds in the water may increase the hatchability of the zebrafish eggs in other ways as well. [2 tables, 18 references]

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Isayev, A. I. (Ichthyological Commission U.S.S.R. Ministry of Fisheries, Moscow, U.S.S.R.)  
Journal of Ichthyology 2, No. 3, 295-301 (1972)

Laws prohibiting pollution of fresh-water bodies from industrial and agricultural sources are required. Enforcement of the laws is necessary to return fresh-water resources to acceptable conditions.

Legislation is also necessary to conserve fresh-water fishery resources. For example, the existence of intakes for power generators or irrigation networks on a body of water used by a fishery industry is a problem of compatibility. It can be solved by implementation of standard practices based on laws that would require installation of screens over the intakes to protect the fish. Otherwise, young fish are killed in turbines or pumping stations, or die in the irrigation ditches in the fields.

Legislation is also required to provide standards for construction of dams and irrigation systems relating to existing or potential fisheries. In addition, regulations are required to provide for controlled water discharge from dams and acceptable logging practices near streams flowing into spawning areas or estuaries.

The U.S.S.R. has many large lakes and rivers with valuable fishing industries established on them. Pollution of these waters from industrial and agricultural activities is endangering the fish stocks. The Government has recognized the problem of pollution and is currently engaged in building treatment plants to

Fletcher, G. L., and R. F. Addison (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada)  
Bulletin of Environmental Contamination and Toxicology 7, No. 2/3, 147-159 (Feb.-Mar. 1972)

In the mining industries, flotation agents are used to separate ores from the unwanted materials (such as silica). Compounds that can serve as flotation agents include straight chain fatty acid salts, alkyl aryl sulfonates, and fatty amines. The U.S.S.R. literature reports the use of alkyl hydroxamic salts for flotation agents and a Canadian firm is currently evaluating the use of a hydroxamate mixture for iron ore flotation. The preparation used by the Canadian group is a mixture of hydroxamic acids prepared from a distillation cut of coconut oil methyl esters, partially neutralized with dimethylamine, and suspended in technical grade isopropanol to a concentration of 75%. Should this preparation be used commercially for the purpose, it is likely that some would eventually appear in local rivers and lakes. The researchers, therefore, carried out this study to assess the toxicity of dimethyl ammonium alkyl hydroxamate and some related compounds to brook trout. Because dimethyl ammonium alkyl hydroxamate consists of a number of molecular species in equilibrium, the toxicity assays were carried out with several of them to determine their contribution to any toxicity that may be found.

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Coulson, J. C., I. R. Deans, G. R. Potts (Department of Zoology, University of Durham, England), J. Robinson, and A. N. Crabtree (Shell Research Ltd., Sittingbourne, Kent, England)  
Nature 236, No. 5348, 456-457 (Apr. 28, 1972)

The authors found significant declines of the concentrations of organochlorine insecticides in the eggs of shag (*Phalacrocorax aristotelis*) in recent years. This observation is noteworthy inasmuch as the shag is a member of the fourth trophic level and the decline of the concentration of pp'-DDE is inconsistent with the model prepared by H. L. Harrison, O. L. Loucks, J. W. Mitchell, D. F. Parkhurst, C. R. Tracy, D. G. Watts, and V. J. Yannacone, Jr. [Science 170, 503 (1970)] that predicts no decrease of DDT concentration in animals at the top of the trophic structure even if no further quantities of the substance are added to the biosphere. [2 figures, 1 table, 12 references]

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Schuphan, Ingolf, and Karlheinz Balcellsmlter (Institut für Anorganische Chemie und Kernchemie der Universität D6500 Mainz, Germany)  
Nature 237, No. 5350, 100-101 (May 12, 1972)

FTP

The median lethal time (LT50) for G. oceanicus exposed to 0.2 mg./l. of Aroclor 1254 solubilized in Corexit 7664 in sea water was 35.1 days. Apparently, no significant biological detoxification process occurred in the animals during the experiments. [4 tables, 8 references]

Wildish, D. J. (Fisheries Research Board of Canada, Biological Station, St. Andrew's, New Brunswick, Canada)  
Bulletin of Environmental Contamination and Toxicology **7**, No. 2/3, 182-187 (Feb.-Mar. 1972)

9.19 POLYCHLORINATED BIPHENYLS (PCB) IN SEA WATER AND THEIR EFFECT ON REPRODUCTION OF GAMMARUS OCEANICUS

### 9.19 ABSENCE OF CHLORINATED DIBENZODIOXINS AND DIBENZOFURANS FROM AQUATIC ANIMALS

Zitko, V. (Environment Canada, Fisheries Research Board of Canada, Biological Station, St. Andrew's, New Brunswick, Canada)

[4 figures, 9 references]

Chlorinated dibenzodioxins are impurities of chlorinated phenols and of herbicides based on chlorinated phenols. Commercial preparations of polychlorinated biphenyls are potential sources of chlorinated dibenzofurans. Residues of chlorinated dibenzodioxins and dibenzofurans were not detectable in the muscle and liver of white shark, in the eggs of double-crested cormorants and herring gulls, in the muscle of eel and chain pickerel, and in commercial samples of herring oil and groundfish-herring fishmeal. The chemicals examined and their detection limits on the tissue weight basis are: 2,3,7,8-tetrachlorodibenzodioxin, 0.04 µg/g.; a mixture of di-, tri-, and tetrachlorodibenzofuran, 0.02 µg./g.; two isomeric hexachlorodibenzodioxins, 0.02 µg./g.; octachlorodibenzodioxin, 0.01 µg./g.; and

According to preliminary work by other workers, the chlorinated dibenzodioxins do not occur widely in the environment. They have been detected, however, in certain poultry feeds and found responsible for hypertrophiccardium in chickens (chick edema factor).

9.19 DDT RESIDUES IN SALINAS RIVER SEDIMENTS

FIP



## THE HIGH-SEA SHRIMP RESOURCES OFF THE GUYANAS AND NORTHERN BRAZIL

Naidu, K. S., and L. K. Boerema (Fish Stock Evaluation Branch, Fishery Resources Division, Food and Agriculture Organization of the United Nations, Rome, Italy) FAO Fisheries Circular No. 141, 18 pp. (March 1972) (Distribution restricted) (Food and Agriculture Organization of the United Nations, Rome, Italy)

The fishing area lies between the mouth of the Orinoco and the mouth of the Amazon off the northeast coast of South America. Shrimp are taken from within 50 to over 100 miles from shore in depths of 15 to 30 fathoms. Best catches are reported at 30 fathoms. The Continental Shelf drops off 50 miles from the coast of Guyana and extends further offshore in a southeasterly direction until the drop-off is over 100 miles from shore at the mouth of the Amazon. Strong northeasterly winds blow continuously from January to mid-April, and fairly heavy swells are normal to the area.

The most abundant species and the basis of the fishery is the spotted pink shrimp *Penaeus brasiliensis*. Other important species are the northern pink shrimp, *P. duorarum*, and the brown shrimp, *P. aztecus*. (The white shrimp, *P. schmitti*, which lives in shallow water are exploited by small trawlers from Trinidad.) The sea-bob shrimp, *Xiphopenaeus kroyeri*, is extremely abundant along the coasts from Cape Hatteras, N.C., to Southern Brazil but is not exploited as it could be. It is estimated that the catch of this species could be increased from the current 3 million lbs. harvested by a factor of 10 or more. Among the species of shrimp inhabiting the deeper waters which may have commercial possibilities are *Solenocera vioscai*, *Plesionopaeus edwardsianus*, and *Hymenopaeus robustus*.

(over)

## 9.2 THE CURRENT STATE OF PRODUCTS LIABILITY LAW

(6.10)

Zietz, Morton K. (Zietz, Sonkin, and Radin, Providence, Rhode Island), in collaboration with Louis Baruch Rubinstein Feedstuffs 44, No. 20, 48, 50, 52, 54, 136 (May 15, 1972)

A products liability claim is defined as "a demand for damages based on injury to persons or property arising from a situation or accident which involves goods or products, manufactured, distributed or sold by the person or firm from whom the damages are sought...."

Application of liability laws has been modified in recent times from the doctrine of privity to the concept of strict liability. The doctrine of privity maintains that there must be a contractual relationship between a person who suffered injury or damage to property and a person or company whose product, it is claimed, caused the injury or damage. With the purchase of a product a privity relationship is established between a consumer and the retailer only. If the consumer was injured or his property was damaged due to a faulty product, he could sue only the retailer for compensation. The consumer could not sue the distributor or manufacturer because he lacked privity with them.

The concept of strict liability is stated as follows: the seller of a product in a condition that is dangerous to the consumer or his property is subject to liability for injury or damage provided the seller is in business to sell the product and it reaches the consumer without a change in the condition in which it is sold. This rule applies, although the seller exercised care in preparation of

(over)

## UTILIZATION OF MARKET MECHANISM FOR PROMOTION OF FISH-PRODUCT SALES BY FISH-PROCESSING INDUSTRIES

Pędziński, Zdzisław (Institute for Exploitation of Marine Resources, WSR ul. Kazimierza Królewicza 4, Szczecin, Poland) Zeszyty Naukowe 35, Rybactwo Morskie II, 227-238 (1971) (In Polish; summary in English) (Science Notes, Marine Fishery II, Higher School of Agriculture of Szczecin, Szczecin, Poland)

The author analyzed the economics of the Polish fishery including application of management principles to marketing within the framework of the goals of the official policies of the Government. Good management promotes demand for fish products, adjusts production to correspond to demand, and sets prices and profits to provide for adequate returns on investment.

Abstract by Jan Walczak modified by SW

[7 references]

FTL

This editorial comment is available from the Icelandic Government offices in Reykjavik, Iceland. (The comment does not indicate where the booklet can be obtained but presumably it is available from the Icelandic Government offices in Reykjavik, Iceland.)

Anonymous Fishing News International 11, No. 5, 15 (May 1972)

## THE DANGER OF WIDER FISHING WATERS

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 8 PAGE 23

## 9.3 CONTROLLING GREAT LAKES POLLUTION: A STUDY IN UNITED STATES-CANADIAN ENVIRONMENTAL COOPERATION

Bilder, Richard B. (University of Wisconsin, Madison, WI 53706)

University of Wisconsin Sea Grant Program, WIS-SG-72-325, Reprinted from the Michigan Law Review 70, 469-556 (Jan. 1972)

This study deals with United States-Canadian cooperation with respect to problems of pollution of the Great Lakes. In June 1971, the two countries announced their intention to conclude a broad-ranging agreement designed to protect and enhance water quality in the Great Lakes and to bring the Great Lakes pollution problem under control by 1975. This article discusses the proposed Great Lakes Water Quality Agreement and the long history of developing United States-Canadian cooperation that preceded it.

The United States-Canadian experience may offer guidance for the solution of some of the specific problems that programs for international cooperation face, involving questions of framework and approach; institutional organization, function, and authority; determination of objectives; apportionment of burdens; coordination; and implementation. Also, the experience calls attention to the contribution that can be made by more limited bilateral and regional cooperative agreements. The experience, too, may serve to point out that the concept of international environmental cooperation has limitations as well as potentialities.

The author hesitates to generalize regarding the cooperative arrangements that the United States and Canada have developed; however, he believes some lessons have been derived, encouraging and discouraging, as follows: (1) Large-scale environmental problems are difficult to solve; (2) Many environmental problems are largely







Analytical Chemistry; Annual Reviews, 44, No. 5, 572 pp. (Apr. 1972)

This review edition is a survey of recent literature in the field of analytical methods and fundamentals. The subjects considered are Amperometric Titrations; Biochemical Analysis; Chemical Microscopy; Chromatography; Electroanalysis and Coulometric Analysis; Electrochemical Relaxation Techniques; Electron Microscopy; Electron Spectroscopy. I. Ultraviolet Photoexcitation; Electron Spectrometry; X-Ray Photoexcitation; Electron Spin Resonance; Emission Spectrometry; Flame Spectrometry; Fluorometric Analysis; Functional Group Analysis; Gas Chromatography; Infrared Spectrometry; Inorganic Analysis; Ion Exchange; Ion Selective Electrodes; Potentiometry; and Potentiometric Titrations; Kinetic Aspects of Analytical Chemistry; Light Absorption Spectrometry; Magnetic Susceptibility. Instrumentation and Applications Including Lunar and Biotype; Mass Spectrometry; Microwave Spectroscopy; Messbauer Spectrometry; Nuclear Magnetic Resonance Spectrometry; Nuclear Magnetic Resonance Spectrometry; Organic Polarography; Polarographic Theory, Instrumentation, and Methodology; Raman Spectrometry; Statistical and Mathematical Methods in Analytical Chemistry; Thermal Analysis; Titrations in Nonaqueous Solvents; Ultraviolet Spectrometry; Use of Enzymes in Analytical Chemistry; X-Ray Absorption and Emission; and X-Ray Diffraction.

RECENT PROGRESS IN THE CONSIDERATION OF FLAVORING INGREDIENTS  
UNDER THE FOOD ADDITIVES AMENDMENT. 5. GRAS SUBSTANCES

Oser, Bernard L. (Food and Drug Research Laboratories Inc., Maurice Ave. at 58th Street, Maspeth, NY 11378), and Richard L. Hall (McCormick & Co., 11350 McCormick Rd., Hunt Valley, MD 21030)  
Food Technology 26, No. 5, 35-37, 40-42 (May 1972)

This article is the fifth in a series dealing with recent progress in the consideration of flavoring ingredients under the Food Additive Regulations for natural and synthetic flavoring substances [Code of Federal Regulations Title 21, Part 121, Sections 1163 and 1164. Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402]. It presents additions to the list of GRAS (generally recognized as safe) substances made in 1970-1971. A table showing the average maximum use level of each substance is given. The authors explain the concept of "toxicological insignificance." Data on the total daily per capita intake of flavoring substances are given. Based on the exaggerated assumption of the daily ingestion of average portions of all classes of flavored foods and the presence of 10 p.p.m. of flavoring agent in each of them, they estimate that the total daily intake would reach 11.5 mg. or only 0.164 mg. per kg. body weight. [1 table, 12 references]

LIMITED ENTRY IN THE SALMON FISHERY:  
THE BRITISH COLUMBIA EXPERIENCE

Campbell, Blake A. (Canada Department of the Environment, Fisheries Service) Pacific Sea Grant Advisory Program No. 6, Published by Fishery Programs Centre for Continuing Education, University of British Columbia, Vancouver, B.C., Canada (May 1972), 13 pp.

The author outlines briefly the evolution, program, and problems involved in the Salmon Vessel License Control Program in British Columbia, Canada.

[4 tables]

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MS  
This book is a collection of essays on the culture of fishing in Sweden, Norway, and Iceland. The essays are written by leading experts in the field of fishing culture and are published by the Institute of Social and Economic Research at the University of Oslo.

Andersen, Raoul, and Cato Wadel  
Published by the Institute of Social and Economic Research at the University of Oslo. (200 pp.)

ANTHROPOLOGICAL ESSAYS  
NORTH ATLANTIC FISHERMEN  
ON MODERN FISHING

9.6

BIBLIOGRAPHY OF LITERATURE: PUGET SOUND MARINE ENVIRONMENT

Collins, Eugene E., and Alyn C. Duxbury (Department of Oceanography, University of Washington, Seattle, WA 98195)  
Washington Sea Grant Publication No. WSG 71-6, 307 pp. (Dec. 1971) (Department of Oceanography, University of Washington, Seattle, WA 98195)

This bibliography contains 1,270 entries. Each entry is coded with one, or more, 13-digit code words. The entries are arranged in major divisions defined by the subregions (27) of Puget Sound to which they pertain. Within these major divisions, the entries are arranged by data classification and sorted chronologically by author. The data classifications consists of 15 groups as follows: Geography; Climatology; Hydrology; Geology; Hydrography; Physical Oceanography; Chemical Oceanography; Biological Oceanography; Biology (other than marine); Water Pollution and Waste Disposal; Pollution, Land and Air; History; Planning; Other; and Bibliographies. There are two appendices: the first lists the entries pertaining to each drainage river basin (7 categories) and the second lists the entries according to land or water use (13 categories).

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### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



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ENGINEERING PROBLEMS IN THE DESIGN AND OPERATION OF PHYTOTRONS

Downs, R. J., H. Hellmers (Botany & Horticultural Science, North Carolina State University, Raleigh, NC 27607), and P. J. Kramer (Duke University, Durham, NC 27706)

ASHRAE (Heating, Refrigerating and Air-Conditioning) Journal 14, No. 6, 47-55 (June 1972)

Phytotrons are laboratories containing precisely controlled environment chambers and greenhouses used to study effects of temperature, humidity, light, and other factors on plant growth. The phytotron requires a building to house it and the mechanical equipment necessary to maintain it. A phytotron unit was constructed at Duke and at North Carolina State Universities. The history of planning, financing, and construction of these units and the architectural and engineering criteria which were established during the planning stage have been published elsewhere. After the phytotrons had been in operation for 3 years, the authors prepared a critique that showed the errors and successes in design and construction that had become apparent.

The authors conclude that a large amount of time spent in planning and checking specifications prior to construction (and close supervision during construction) was rewarded in terms of efficient operation of the phytotron. However, greater vertical flexibility in the building should have been provided, in addition to improved ease of maintenance by better accessibility to mechanical components, grease fittings, and air vents.

[8 figures, 1 table, 7 references]

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RECENT PHYSICAL STUDIES OF THE STRUCTURE OF BIO-MEMBRANES

Chapman, D. (editor)

Chemistry and Physics of Lipids 9, No. 4, 259-404 (May 1972)

This conference on recent physical studies of the structure of bio-membranes, held on October 28-30, 1971, in Trieste, was organized by D. Chapman, Chemistry Department of the University, Sheffield. This issue of the Journal contains the reports presented at the conference including a summary of the discussion that followed the presentation of each report. In the preface the editor states that physical techniques are being widely used in the study of the structure and function of biological membranes and that the aim of the conference was to bring together the research workers most active in this area of research to discuss their latest findings. Some of the important topics discussed in the 19 articles were (1) interpretation of freeze-etch electron micrographs, (2) the phase problem associated with X-ray studies of membranes, (3) feasibility of determining the amount of bilayer present in a membrane by X-ray methods, (4) organization of the protein in the membrane, (5) possibility of using spin probes for studying phase transition membranes, (6) artifacts present in interpretation of CD spectra of membranes, and (7) the possibility of obtaining satisfactory spectra from non-solicated membranes.

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0.16

LIPID METABOLISM DURING COLD-EXPOSURE AND DURING COLD-ACCLIMATION

Himmels-Hagen, Jean (Department of Biochemistry, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5)

Lipids 7, No. 5, 310-323 (May 1972)

This review article deals with the role of lipid metabolism in the regulatory mechanisms for increasing heat production in the cold. In particular, the roles of two lipid-storing tissues (the white adipose tissue and the brown adipose tissue) are considered. The author describes three roles for these tissues as follows: (1) provision of substrate to support the increased metabolic rate (involving white adipose tissue and brown adipose tissue), (2) heat production (brown adipose tissue), (3) maintenance of the adaptive state needed for an animal to be able to use nonshivering thermogenesis (brown adipose tissue). The discussion deals first with changes in lipid metabolism occurring in response to cold-exposure and on the role of the white adipose tissue in shivering thermogenesis. Then, the nature of nonshivering thermogenesis, together with the roles of the brown adipose tissue, is discussed.

[1 figure, 1 table, 138 references]

FTP

Casey, M., and B. Blanc (Swiss Fed., Dairy Res. Stn., Liebefeld-Bern, Switzerland)

Chemical Abstracts 76, No. 19, 110834b (May 8, 1972)

EFFECT OF ESSENTIAL AMINO ACIDS ON ABSORPTION OF PHENYLALANINE BY RAT INTESTINE

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0.33

0.4

PERMEABILITY AND ENTEROTOXIC FACTORS OF NONAGGLUTININABLE VIBRIOS (0.5)

Bhattacharya, S., A. K. Bose, and A. K. Ghosh (Cholera Research Centre Indian Council of Medical Research, Calcutta-16, India)

Applied Microbiology 22, No. 6, 1159-1161 (Dec. 1971)

Earlier work has indicated that nonagglutinable vibrios (NAG), strains of *V. alcaligenes*, and *V. parahaemolyticus* (apart from *V. cholerae*) can produce the clinical syndrome of cholera. The pathophysiological changes that occur in cholera involve a cell-free exotoxin elaborated by the organism *V. cholerae* containing two principal factors: (1) an enterotoxin factor that is responsible for the initiation of accumulation of fluid in the gut of humans and experimental animals and (2) a permeability factor (skin toxin) that produces increased vascular permeability in the skin of experimental animals. Little is known about the toxin (if any) of other organisms implicated in acute cases simulating cholera, nor is it known whether similar enterotoxin factor and permeability factor are elaborated by these other organisms. Thus, the present study was carried out to determine whether the enterotoxin factor (EF) and the permeability factor (PF) were elaborated by nonagglutinable vibrios (34 strains were examined), *V. alcaligenes* (7 strains), and *V. parahaemolyticus* (4 strains). Guinea pigs and rabbits were used in this experimental work.

Some strains of nonagglutinable vibrios are capable of elaborating cell-free toxin containing the enterotoxin factor; also, the EF can be induced in strains of nonagglutinable vibrios by animal passage. The NAG strains did not show presence of the permeability factor (skin toxin), suggesting that the EF is the primary

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# CHROMOSOMAL PROTEINS IN THE DINOFLAGELLATE ALGA (GYRODINIUM COHNII)

Rizzo, Peter J., and Larry D. Noodén (Botany Department, University of Michigan, Ann Arbor, MI 48104)  
Science 176, No. 4036, 796-797 (May 19, 1972)

[All living cells are basically similar in structure and organization, having similar functional subunits--for example, the nucleus. Through a process of evolution some of these subunits have been modified. An example of a modification is that of the nucleus containing the genetic material deoxyribonucleic acid (DNA). In the more highly evolved corn root cell, DNA is located in the cell in a clearly defined nucleus enclosed in a nuclear membrane. This higher evolutionary form is termed a eukaryote. In primitive evolutionary forms such as bacteria, the nucleus is not enclosed in a membrane, and the cell is called a prokaryote. The ratio of the amount of protein to the amount of DNA in chromatin (from chromosomes) in the nucleus is another factor used in distinguishing eukaryotes from prokaryotes. Abstractor's note]

Experiments were performed on chromosomes of dinoflagellate *G. cohnii* in the analysis of structure and the regulation of gene action in eukaryotes. Results of the investigation showed that the ratio of the amount of protein to the amount of DNA is higher in the dinoflagellate than the ratio found in prokaryotes and lower than the ratio found in eukaryotes. The authors suggest that the nuclear organization of dinoflagellates is intermediate in evolutionary development between prokaryotes and eukaryotes. In addition, small amounts of acid-soluble protein (which may be histone) found in the chromatin are not as important in gene repression in prokaryotes as they may be in eukaryotes.

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[1 figure, 1 table, 25 references]

0.118

# TEXTUROMETER FOR MEASURING THE TOUGHNESS OF COOKED FISH

Main, G., R. I. Ross, and A. H. Sutton  
Lab. Pract. 21, No. 3, 185-188 (1972)  
BFMRA Abstracts 25, No. 5, Abstract No. 1586, 322 (May 1972)

The texture of fish consists of two parameters, succulence and hardness. An improved penetrometer which is suitable for research or commercial use is described. The experiments show that it is possible to obtain a very high correlation between a penetrometer and organoleptic measurement of toughness in cooked fish. Diagrams of the measuring instruments, a circuit diagram and a list of components are given.

Reprinted

# DENATURATION OF FISH MUSCLE PROTEIN DURING DEHYDRATION

Suzuki, Taneko (Tokai Reg. Fish. Res. Lab., Tokyo, Japan)  
Chemical Abstracts 76, No. 19, 110544g (May 8, 1972)

0.4 (0.5)

factor for induction of cholera syndrome and that PF does not play an important role. *V. parahaemolyticus* showed presence of PF but not EF, suggesting that the pathogenicity of these organisms is quite different from that of *V. alcaligenes*. *V. vibrios*. EF and PF were absent in the strains of *V. alcaligenes*. [2 tables, 9 references]

FTD

# CHOLESTEROL METABOLISM IN AORTA AND IN TISSUE CULTURE

Kritchevsky, David (The Wistar Institute of Anatomy and Biology, Philadelphia, PA 19104)  
Lipids 7, No. 5, 305-309 (May 1972)

This article is a review of information on metabolism of cholesterol in aorta and in tissue culture. Such information is of interest in the field of atherosclerosis research. According to the definition by the World Health Organization, atherosclerosis is a variable combination of changes of the intima of arteries (as distinct from arterioles) consisting of the focal accumulation of lipids, complex carbohydrates, blood and blood products, fibrous tissue, and calcium deposits, and associated with medial changes.

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# BACTERIOPHAGE T7

Studier, F. William (Brookhaven National Laboratory, Upton, NY 11973)  
Science 176, No. 4033, 367-376 (Apr. 28, 1972)

Bacteriophages are among the simplest biological entities known, and they carry out basic biological processes that are common to the most complex organisms. In genetic studies, phage systems are selected because they are easier to manipulate genetically than more complex systems. Mutations can be obtained in any phage function and biochemical analysis of mutant strains can often reveal the molecular interactions that make up a biological process. Phage T7 was selected for study because it is of manageable size. Experiments were performed to find a mutation in each of its genes, to determine the function of each of its proteins, and to define the molecular details of the processes directed by T7 after it infects a bacterium.

Twenty-five mutations were found, and proteins specified by 23 of these mutant genes were identified. These genes accounted for 90% of T7 DNA coding capacity. In addition, three classes of genes were distinguished. Class I and II genes seem to be concerned with control of gene expression and breakdown of host DNA and synthesis of T7 DNA. The proteins of the mature phage particle are specified by class III genes.

Further studies using T7 phage will explore molecular mechanisms underlying control of gene expression, synthesis of DNA, genetic recombination, and the assembly of virus particles.

[3 figures, 1 table, 53 references]

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0.4 MARINE PHARMACOLOGY: MODE OF ACTION OF TOXINS ON  
(2.9) EXCITABLE TISSUES [BIOCHEMICAL SOCIETY SYMPOSIUM]

[Authors and titles listed below]

Federation Proceedings 31, No. 3, 1115-1149 (May-June 1972)

Card A

"Introduction," by Toshio Narahashi (Department of Physiology and Pharmacology, Duke University Medical Center, Durham, NC 27710), *ibid.*, pp. 1115-1116.

Inasmuch as about four-fifths of the Earth's animals live in or on the seas and perhaps a few thousand of the species contain toxic substances, it is conceivable that many potentially useful drugs may be found in marine sources. The topics of this symposium on marine pharmacology were limited to those dealing with the mechanism of action of marine toxins on excitable tissues. Certain toxins (and venoms) are useful tools to the study of physiology and pharmacology. Not only are they extremely potent, but they exert high specific actions. Puffer fish toxin (tetrodotoxin), for example, at very low concentrations specifically inhibits the increase in sodium permeability of nerve membranes, the key mechanism of nerve excitation, without any effect on other excitation parameters. The chemical is now being used as a tool for studies of neurophysiology and neuropharmacology.

The toxins considered in this symposium are tetrodotoxin, saxitoxin, batrachotoxin, ciguatera, and saponins. Batrachotoxin is from the Colombian arrow-poison frog living in jungles; the frog is an aquatic species but not of marine origin. This toxin was included in the Symposium because of its highly important characteristics in interpreting the mode of action of marine toxins on excitable tissues. Each of the toxins discussed is either being used as a pharmacological tool or is expected to be developed into a useful tool or into medical application. [2 figures, 28 references]

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0.4 MARINE PHARMACOLOGY: MODE OF ACTION OF TOXINS ON  
(2.9) EXCITABLE TISSUES [BIOCHEMICAL SOCIETY SYMPOSIUM]

[Authors and titles listed below]

Federation Proceedings 31, No. 3, 1115-1149 (May-June 1972)

Card B

"The Mode of Action of Batrachotoxin," by E. X. Albuquerque (Department of Pharmacology, School of Medicine and Dentistry, State University of New York at Buffalo, Buffalo, NY 14214), *ibid.*, pp. 1133-1138.

Amphibians have developed a variety of cardiotoxic and neurotoxic compounds that are involved in the defense mechanism of these animals. Batrachotoxin is found in the skin secretions of the small frog *Phylllobates aurotaenia* from Colombia, South America.

The compound is a 20 $\alpha$  ester of batrachotoxinin A with 2,4-dimethylpyrrole-3-carboxylic acid. The toxin causes a selective increase in sodium permeability in a variety of electrogenic membranes. [12 figures, 21 references]

"Mode of Action of Ciguatera," by M. D. Rayner (Department of Physiology, University of Hawaii School of Medicine, Honolulu, HI 96822), *ibid.*, pp. 1139-1145.

The author indicates that the pharmacological actions of ciguatera appear to be related to its direct effects on excitable membranes rather than to its previously reported anticholinesterase properties *in vitro*. [7 figures, 1 table, 31 references]

"Mode of Action of Marine Saponins on Neuromuscular Tissues," by S. L. Fries (Environmental Biosciences Department, Naval Medical Institute, Bethesda, MD 20014), *ibid.*, pp. 1146-1149.

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0.5 ENRICHMENT, ISOLATION, AND CULTURAL CHARACTERISTICS  
(2.05) OF MARINE STRAINS OF CLOSTRIDIUM BOTULINUM TYPE C

Segner, W. P., C. F. Schmidt, and J. K. Boltz (Metal Division Research and Engineering, Continental Can Co., Inc., Chicago, IL 60620)  
Applied Microbiology 22, No. 6, 1017-1024 (Dec. 1971)

*Clostridium botulinum* type C is usually associated with animal botulism, but one human outbreak occurred in California in 1950. The known strains of the organism are nonproteolytic and thus are similar to those *botulinum* types capable of low-temperature growth—only type E and nonproteolytic types B and F possess psychrophilic characteristics. Because type C is present in the marine environment, it might also exhibit low-temperature growth ability. The authors, therefore, isolated four strains of *C. botulinum* type C from marine sediments and determined certain cultural and biochemical characteristics of these strains.

Egg meat medium fortified with 1% additions of yeast extract, ammonium sulfate, and glucose (FEM medium) was used to recover the four marine type C isolates from inshore marine sediments collected along the Atlantic, Gulf of Mexico, and Pacific Coasts of the United States. The cultures showing type C toxin were repeatedly transferred into FEM medium and then purified by a deep tube method. The purification medium was beef infusion-agar supplemented with 0.14% sodium bicarbonate and 0.1% L-cysteine hydrochloride (L-cysteine was used because some lots of sodium thioglycolate inhibit growth of *C. botulinum* type C). The addition of marine and terrestrial strains of type C organisms. The cultural and biochemical characteristics of the marine strains were compared with those of terrestrial strains. Both groups showed similar characteristics, with the exception of some

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0.5 TAXONOMY OF AEROBIC MARINE EUBACTERIA

Baumann, Linda, Paul Baumann, M. Mandel, and Richard D. Allen (Department of Microbiology, University of Hawaii, Honolulu, HI 96822, and Department of Biology, University of Texas, M. D. Anderson Hospital and Tumor Institute of Houston, TX 77025)  
Journal of Bacteriology 110, No. 1, 402-429 (Apr. 1972)

This study is a beginning in the taxonomic characterization of gram-negative, flagellated, nonfermentative bacteria of marine origin. The 218 strains of marine bacteria examined were either straight or curved rods and were motile by means of polar or peritrichous flagella. The various strains were able to utilize from 11 to 85 carbon compounds. On the phenotypic similarities, the various strains were clustered into 22 groups.

The groups having peritrichous flagella were assigned the genus *Alcaligenes*. The groups having polar flagella and a GC content (moles percent guanine plus cytosine content in the deoxyribonucleic acid) of from 43.2 to 48.0 moles % were placed in a newly created genus *Alteromonas*; those polarly flagellated groups having a GC content of from 57.8 to 64.7 moles % were placed in the genus *Pseudomonas*; and the groups that remained were left unassigned. Eleven groups were designated as follows: *Alteromonas communis*, *A. vaga*, *A. macleodii*, *A. marinoprae-cupidus*, *A. venustus*, and *A. aestus*.

[46 figures, 6 tables, 55 references]

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Saponins are found in certain poisonous species of marine echinoderms (particularly sea cucumbers and starfishes). The structural characteristics of these steroidal saponins consist of: (1) a complex steroid nucleus, (2) a series of closely related sugars attached glycosidically to the 3-position of the steroid, and (3) a negative charge locus imparted by esterification of a sugar hydroxyl group with a sulfuric acid moiety. This paper discusses the interactions of these steroidal saponins with neuromuscular tissues under normal and stressful environmental conditions. [6 figures, 10 references]

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[6 figures, 10 references]

The toxicity of methyl mercury is briefly discussed and the Total Diet Study at present being carried out in the U.K. to assess the average dietary intake of pesticides, which provides a means of estimating mercury intake is described in some detail. D.M.L.

Reprinted

Br. Pd J. 74, No. 847, 37-38, 44 (1972)

BEMIRA Abstracts 25, No. 6, Abstract No. 2069, 418 (June 1972)

#### MERCURY AND HEAVY METALS IN FOOD. PART II.

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Anonymous  
Br. Pd J. 74, No. 847, 37-38, 44 (1972)

BEMIRA Abstracts 25, No. 6, Abstract No. 2069, 418 (June 1972)

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#### HEAT RESISTANCE OF SPORES OF MARINE AND TERRESTRIAL STRAINS OF CLOSTRIDIUM BOTULINUM TYPE C

Segner, W. P., and C. F. Schmidt (Metal Division Research and Engineering, Continental Can Co., Inc., Chicago, IL 60620)  
Applied Microbiology 22, No. 6, 1030-1033 (Dec. 1971)

The only comprehensive report on the heat resistance of *C. botulinum* spores of seven type C strains was published in 1924 (I. A. Bengtson, U.S. Public Health Service Hygiene Laboratory Bulletin, No. 136, pp. 1-97 (1924)). The present study, therefore, examined the heat resistance of spores of four marine and two terrestrial strains of *C. botulinum* type C.

The heat resistance was determined in Sørensen's phosphate buffer (0.067 M, pH 7.0). The inoculum level was  $10^6$  spores per tube with 10 replicate tubes for each time-temperature variable. Various time-temperature combinations were carried out to obtain survivors in some fraction of the replicates. The surviving spores were recovered at 30° C. (85° F.) using beef infusion broth containing 1% glucose, 0.10% L-cysteine hydrochloride, and 0.14% sodium bicarbonate. D values (time in minutes at a specified temperature to cause a tenfold reduction in spore count) were calculated for each fractional survivor end point after 6 months of incubation. The D value data was used to construct thermal resistance curves of the spores.

The D220 values for the spores of the two terrestrial strains of *C. botulinum* type C equaled 0.90 min. for the one and 0.40 min. for the other. The D220 values for spores of four marine strains of *C. botulinum* type C equaled 0.12 min. for the first, 0.40 min. for the second, 0.02 min. for the third, and 0.08 min. for the fourth. The z values for the thermal resistance curves of the various strains ranged from 9.0° F. (5.0° C.) to 11.5° F. (6.2° C.). [The z value is the difference in temperature between two points on the thermal death time curve that differ by a multiple of 10 on the time scale.]

[fig 1]

(50.2) 5.0

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variations in fermentation patterns. The terrestrial strains attacked only glucose and mannose (23 fermentable compounds were tested). The marine strains of *C. botulinum* type C fermented actively glucose, mannose, galactose, and ribose; they fermented weakly dextrin, inositol, maltose, and melibiose. The authors concluded that the marine and terrestrial strains appear to be closely related and that only moderate differences in fermentation patterns separate the two groups of strains. Even so, they indicate, the significance of these differences may be questionable because widely variable patterns have been reported in the literature.

[references]

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The author found that when pure or artificial mixtures of *E. coli* with other organisms were used, the same characteristic pattern of nitrate reduction and nitrite decomposition resulted. *Pseudomonas* spp. in mixed cultures were unable to degrade nitrite and *B. subtilis* was similarly inhibited by the presence of enterococci. The author found there were two types of nitrate to nitrite reduction. That primarily due to the activity of *E. coli* resulted in the formation of nitrite which was rapidly degraded. In the other type of reduction caused by a mixture of aerobic spore-formers with very few coli present, the nitrite formed is very slowly degraded and may be present for several days. I.P.

FORMATION AND DEGRADATION OF NITRITE IN NITRATE CONTAINING FOODS. II. COMMUNICATION: THE EFFECTS OF NATURAL AND ARTIFICIAL MIXTURES OF ORGANISMS  
Selenka, F.  
Zentbl. Bakt. Parasitkde, 1 Abt. Orig. B., 155, No. 1, 58-69 (1971) (In German, English abstract)  
BEMIRA Abstracts 25, No. 6, Abstract No. 1998, 404 (June 1972)

The author found that when pure or artificial mixtures of *E. coli* with other organisms were used, the same characteristic pattern of nitrate reduction and nitrite decomposition resulted. *Pseudomonas* spp. in mixed cultures were unable to degrade nitrite and *B. subtilis* was similarly inhibited by the presence of enterococci. The author found there were two types of nitrate to nitrite reduction. That primarily due to the activity of *E. coli* resulted in the formation of nitrite which was rapidly degraded. In the other type of reduction caused by a mixture of aerobic spore-formers with very few coli present, the nitrite formed is very slowly degraded and may be present for several days. I.P.

FORMATION AND DEGRADATION OF NITRITE IN NITRATE CONTAINING FOODS. II. COMMUNICATION: THE EFFECTS OF NATURAL AND ARTIFICIAL MIXTURES OF ORGANISMS

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MINIMAL GROWTH TEMPERATURE, SODIUM CHLORIDE TOLERANCE,  
PH SENSITIVITY, AND TOXIN PRODUCTION OF MARINE AND  
TERRESTRIAL STRAINS OF CLOSTRIDIUM BOTULINUM TYPE C

Segner, W. P., C. F. Schmidt, and J. K. Boltz (Metal Division Research and Engineering, Continental Can Co., Inc., Chicago, IL 60620)  
Applied Microbiology 22, No. 6, 1025-1029 (Dec. 1971)

Because type C Clostridium botulinum exists in marine environments and because of its cultural similarity to botulinum types known to possess low-temperature growth ability, the authors surmised that marine strains of type C might show psychrophilic growth characteristics. The primary purpose of this study, then, was to compare the minimal growth temperatures of marine and terrestrial strains of C. botulinum type C. At the same time, examination was made of the sodium chloride tolerance, pH sensitivity, and toxin-producing ability in various culture media of these organisms. Four marine strains and two terrestrial strains of C. botulinum were used.

The minimal growth temperatures of the organisms were determined in a laboratory culture medium, in fortified egg meat medium (FEM), and in ground haddock. Five-tube replicate sets were used, with an inoculum of  $2 \times 10^6$  viable spores per tube. To reduce toxin carryover, the spores were preheated in an aqueous suspension at 71° C. for 15 min. before they were inoculated into the tubes. The four marine and two terrestrial strains grew at 15.6° C.; only the terrestrial strains grew at 12.8° C.; and none of the strains grew at 10° C. during prolonged incubation.

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RELATIONSHIPS OF TEMPERATURE AND SODIUM CHLORIDE CONCENTRATION  
TO THE SURVIVAL OF VIBRIO PARAHAEMOLYTICUS IN BROTH AND  
FISH HOMOGENATE

Covert, Donna, and Margy Woodburn (Departments of Foods and Nutrition and Home Economics Research, Oregon State University, Corvallis, OR 97331)  
Applied Microbiology 23, No. 2, 321-325 (Feb. 1972)

Vibrio parahaemolyticus is a major cause of gastroenteritis in Japan, and four outbreaks may have been identified in the United States. The organism has been isolated from coastal water and from fish of the United States. It may, therefore, be of potential concern.

Many of the foods implicated in Japanese outbreaks were marine fish and salted vegetables. V. parahaemolyticus is halophilic, and it is possible that certain optimal salt concentrations may enhance cellular resistance to stress conditions (such as temperature). The purpose of the present study was to determine the survival of V. parahaemolyticus in Trypticase soy broth (TSB) and in fish homogenate, with various concentrations of salt and during heating and low-temperature storage. Three strains of the organism were used; two from Japanese sources and one from a United States source. Trypticase soy broth was used as the basic system. A frozen and thawed homogenate composed of sturgeon, ling cod, and black rockfish was used as the food system. NaCl was added to both systems at 3, 6, 9, and 12% levels. The temperature levels used were  $48 \pm 1^\circ \text{C}$ ,  $5^\circ \pm 1^\circ \text{C}$ ,  $-5^\circ \pm 1^\circ \text{C}$ , and  $-18^\circ \pm 1^\circ \text{C}$ . Sampling times were appropriate for the temperature levels used.

The cells of V. parahaemolyticus suspended in TSB (without added NaCl) were readily killed. When the cells were suspended in TSB containing NaCl and exposed

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CLOSTRIDIUM BOTULINUM IN SEDIMENTS FROM THE  
CANADIAN ATLANTIC SEABOARD

Laycock, R. A., and A. A. Longard (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
Journal of the Fisheries Research Board of Canada 29, No. 4, 443-446 (Apr. 1972)

Certain preservation processes for fish and shellfish (pasteurization of crab and shrimp meat and low-level irradiation of fish filets) rely upon adequate refrigeration of the product to prevent growth of pathogens possibly unaffected by the treatment. An understanding of the potential botulism hazard from such products requires knowledge of the distribution of the causative organism C. botulinum in the environment. In the present study, an examination was made of the occurrence of C. botulinum types on the continental shelf off eastern Canada. 251 bottom samples from 107 sampling stations were collected from the continental shelf off Nova Scotia and 65 bottom samples from 27 stations off Newfoundland using a gravity corer and a pipe dredge.

Types B, C, and E of C. botulinum were found in the bottom samples from the continental shelf off Nova Scotia; types B and E were found only in low concentrations, but localized areas of high concentrations of type C were found. Type E was found off Newfoundland with high incidence of the organism occurring as far as 105 miles off the northeast coast. In general, C. botulinum seemed to be absent from the shallower bank areas but was present in the deeper waters within and bordering upon the continental shelf.

Because of the variation in the distribution of C. botulinum in this marine environment, the extent of the occurrence of the organism in fish and shellfish

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(2.05)

PRODUCTION OF TYPES A AND B SPORES OF CLOSTRIDIUM BOTULINUM  
BY THE BIPHASIC METHOD: EFFECT ON SPORE POPULATION,  
RADIATION RESISTANCE, AND TOXIGENICITY

Anellis, Abe, D. Berkowitz, D. Kemper, and D. B. Rowley (Food Laboratory, Microbiology Division, U.S. Army Natick Laboratories, Natick, MA 01760)  
Applied Microbiology 23, No. 4, 734-739 (Apr. 1972)

In a research study involving inoculated food packs and designed to determine the minimal radiation dose for foods, the authors needed a minimum of 100 ml. of spore suspension containing  $10^8$  spores/ml. of each of 10 strains of C. botulinum. Because the preparation and harvesting of these 10 strains of C. botulinum spores required a minimum of 6 weeks, the authors sought a more rapid, convenient, and economical technique for producing them, without reducing their radiation resistance and capacity to produce toxin in growth cultures. The biphasic procedure (involving a solid medium overlaid with an aqueous phase) had been examined by earlier workers and it seemed to offer some advantages over the conventional (deep broth culture) technique. In the present study, the authors examined the effect of several aqueous phases (in the biphasic method) on sporogenesis, and compared the radiation resistance and toxin-forming capability of cultures derived from spores of three type A strains and three type B strains of C. botulinum produced by the biphasic and the conventional procedures.

In the conventional method for spore production, Trypticase peptone broth was used. In the biphasic method, BBL Trypticase peptone, with added yeast extract and agar, was used. The three liquid phases used in the biphasic method contained thiamine-hydrochloride, yeast extract, or  $(\text{NH}_4)_2\text{SO}_4$ .

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STUDIES ON THE ANTIBACTERIAL SUBSTANCES OF SPONGES.  
VI. STRUCTURES OF TWO ANTIBACTERIAL SUBSTANCES ISOLATED  
FROM THE MARINE SPONGE DYSIDEA HERBACEA

Sharma, G. M., and B. Vig (Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964)

Tetrahedron Letters No. 17, 1715-1718 (1972) (Pergamon Press: New York, London)

Two antibacterial substances, designated A and B were isolated from the sponge *D. herbacea* obtained from the western Caroline Islands. Substance A has the molecular composition of  $C_{12}H_5O_2Br_5$ . It is a pentabromo derivative of 2-hydroxy-diphenyl ether. Substance B has the molecular composition  $C_{12}H_8O_2Br_2$ . It is a dibromo derivative of 2-hydroxy-diphenyl ether. This paper describes the procedures involved in the isolation and the determination of the structure of the two antibacterial substances.

[8 references]

ETP

211

may be expected to vary. For example, hake and redfish are caught in deeper waters where high concentrations of *C. botulinum* were found; haddock and cod are caught in shallower bank areas where the organism was not detected.

0.5 (2.05)

0.7  
(6.54)

# MEETING OF THE PAG AD HOC WORKING GROUP ON SINGLE CELL PROTEIN

Anonymous  
FAG Bull. [FAO/WHO/UNICEF, United Nations, New York, N.Y.], 2, No. 1, 2-5 (1971).  
FEMIRA Abstracts 25, No. 5, Abstract No. 1678, 340 (May 1972).

An account of a meeting held during June 1971 at the Institute of Nutrition in Moscow. The problems presented by the adverse effects of nucleic acids ingested in large quantity were briefly discussed together with the nutritional value and potential food uses of single cell protein. A list of substrates suitable for single cell protein production is given. L.P. Reprinted

DLJ

Sporogenesis of the various strains of *C. botulinum* was more rapid, convenient, and economical by the biphasic method than by the conventional method; furthermore, the biphasic method yielded as many or more heat resistant (80° C. for 10 min.) spores per milliliter as did the conventional one. Of the three liquid phases tested, the highest spore colony counts were obtained with the liquid phase of 2.0%  $(\text{NH}_4)_2\text{SO}_4$ . Maximum numbers of spores for all six strains formed after 5 to 6 days of incubation. Spores produced by the biphasic and conventional methods had essentially equal radiation resistances and their subcultures gave similar toxin titers, [6 tables, 7 references] Ftp

0.5 (2.05)

0.5  
(4.5)  
INFLUENCE OF HERRING MICRO-ORGANISMS ON FAT OXIDATION.  
1. DECOMPOSITION OF LINOLEIC ACID HYDROPEROXIDES

Grosch, W., F. Senger, and K. Fischer  
Lebensmittelunters. u.-Forsch. 147, No. 3, 140-144 (1971) (In German, English  
summary)  
BEMIRA Abstracts 25, No. 2, Abstract No. 493, 103 (Feb. 1972)

The effect of 11 micro-organisms isolated from heating on linoleic acid hydroperoxides was investigated. The activity of the micro-organisms was divided into two groups, fast and slow breakdown of the hydroperoxides. C.S.B. Reprinted

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The sodium chloride tolerance and pH sensitivity of the organisms were determined at 30° C. using beef infusion broth medium. The inoculum level was  $2 \times 10^6$  spores (unheated) per replicate. Growth of the marine and terrestrial strains of *C. botulinum* type C was inhibited at salt levels from 2.5% to 3.0%. The terrestrial strains were more pH sensitive than were the marine strains; the terrestrial strains did not grow at pH below 5.62, three of the marine strains grew at pH 5.10 but not at pH 4.96, during extended incubation, and one marine strain grew at pH 5.25 but not at a lower pH level.

High levels of botulinum toxin were produced when the organisms were grown in fortified egg meat medium and proteose peptone-Trypticase-yeast extract-glucose medium. Toxin produced by the marine and the terrestrial strains of *C. botulinum* type C showed no increase in toxicity after incubation with trypsin.

FTP  
5 tables, 21 references]

### 0.6 FUNCTIONAL PROPERTIES OF PROTEINS FOR FOOD SWELLING

Hermansson, A. M.  
Lebensm.-Wiss.+Technol. 5, No. 1, 24-29 (1972) (In English)  
BFIIRA Abstracts 25, No. 5, Abstract No. 1579, 320 (May 1972).

A method was adapted for measuring the spontaneous uptake of water of proteins. The proteins studied were soya protein isolate, caseinate and whey protein concentrate. Swelling was dependent on pH and ionic strength. Heating concentrated dispersions of proteins produced gelation; except with caseinate. Good correlation was found between gel strength and swelling capacity. C.S.B.

ДЛЯ

to temperature of  $18^{\circ} \pm 1^{\circ} \text{C}$ , the salt appeared to be protective to the cells. Within the range of from 3% to 12% tested, the optimum level of NaCl was strain dependent. When the test samples were held at  $5^{\circ} \pm 1^{\circ} \text{C}$ ,  $-5^{\circ} \pm 1^{\circ} \text{C}$ , or  $-18^{\circ} \pm 1^{\circ} \text{C}$ , the number of viable organisms per milliliter decreased regardless of the salt concentration. However, in the presence of added NaCl (in TSB), viable cells of the organism, in numbers up to 580 per ml., were detected at the end of the 30-day storage period.

Results for cells suspended in fish homogenate were similar to those for cells suspended in TSB, except that the fish homogenate was protective to the cells as compared to the TSB. This protection afforded by the fish homogenate was significantly lower than that provided by the NaCl at any of the levels tested. [2 figures, 3 tables, 10 references] FTP

0.5



<p>0.7 (9.13)</p> <p>SULFATE METABOLISM AND TAURINE SYNTHESIS IN THE CHICK</p> <p>Martin, William G. (Division of Animal and Veterinary Sciences, West Virginia University, Morgantown, WV 26506) Poultry Science <u>51</u>, No. 2, 608-612 (Mar. 1972)</p> <p>The relation of sulfate in the diet of chicks, taurine synthesis, and increased growth response was investigated. Day-old chicks were fed a purified-type diet supplemented with various levels of methionine and sulfate for 12 days. On the 13th day radioactive sulfate (<sup>35</sup>SO<sub>4</sub>) was orally administered to the chicks. On the 14th day they were killed and the livers were removed for taurine assay. In another experiment various levels of methionine, sulfate, and taurine supplemented the diet. After 14 days, growth response increased significantly when the diet was supplemented with sulfate and methionine.</p> <p>The in vitro synthesis of taurine-<sup>35</sup>S in liver from chicks fed the various level diets was measured. The total taurine in the liver increased, paralleling the methionine and sulfate induced-growth response. Further analysis showed that a portion of the sulfate was used in the synthesis of phosphoadenosinephosphosulfate (PAP<sup>35</sup>S) which is required for the synthesis of taurine by this pathway. Methionine was shown to enhance the synthesis of taurine in the liver, and sulfate was shown to enhance the in vitro synthesis of PAP<sup>35</sup>S. The author suggests that a part of the growth response caused by addition of sulfate to the diet is due to the reaction in which it is used in the synthesis of taurine. SW</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 9 PAGE 7</p>	<p>0.7</p> <p>SYMPOSIUM ON THE CHEMICAL ASPECTS OF NUTRITION NEEDS</p> <p>[Authors and titles listed below] Journal of Agricultural and Food Chemistry <u>20</u>, No. 3, 455-537 (May-June 1972)</p> <p>Card B</p> <p>the use of the Probyte in terms of human requirements is described, including the corrections for biological value, corrections for losses in processing, and methods for setting a single protein standard in crop genetics research and pricing of commodities. The Probyte has as its only dimension a calorie of essential amino acids; therefore, it can be applied in systems analysis, pricing policies, nutrition economics, and design of least-cost diets. Some examples of its use in systems models are given. [3 figures, 9 tables, 30 references]</p> <p>"Chemical Aspects of Updating Diet Quality," by W. H. Sebrell, Jr. (College of Physicians and Surgeons, Columbia University, New York, NY 10032), pp. 518-522.</p> <p>The use of chemicals for the nutritional improvement of foods began with the addition of iodides to salt to help prevent goiter and of vitamin D to prevent rickets. Now, several hundred chemicals have been approved to improve the color, flavor, texture, keeping quality, and nutritional value of foods. The enrichment of flour, bread, and other cereals is an outstanding example of the successful, economic use of chemicals to improve the nutritive value of foods.</p> <p>The author believes that we should do everything possible to make our food supply nutritionally adequate at the lowest possible cost. To do this we must use safe and effective synthetic nutrients of all kinds.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 9 PAGE 7 (over)</p>
<p>0.7</p> <p>SYMPOSIUM ON THE CHEMICAL ASPECTS OF NUTRITION NEEDS</p> <p>[Authors and titles listed below] Journal of Agricultural and Food Chemistry <u>20</u>, No. 3, 455-537 (May-June 1972)</p> <p>Card C</p> <p>Data are reported from a field study in which kindergarten children were provided either breakfast and lunch (BL Groups) or specific nutrients in a fruit-flavored drink (NC Groups). The breakfast included milk nearly every day, dry cereal, grits, meat, or cheese-toast several times a week. The lunch was a "type A" lunch which contained at least one-third of a Recommended Daily Allowance of vitamins, minerals, proteins, and calories per school week. The specific nutrients used for supplementation (NC Groups) were those that were limited in the diet of children of the area (determined from previous studies). Various biochemical tests were conducted to observe the changes in the nutritional status of the groups. Appropriate control groups were included.</p> <p>In the group fed breakfast and lunch, a change in the distribution of biochemical values occurred and a larger percentage of the children moved into the acceptable ranges for hemoglobin, hematocrits, and serum iron at the conclusion of the experiment. The BL group showed significant improvements over its control group for the distribution of serum folacin, serum iron, and transferrin saturation. All groups, including the controls, showed an increase for vitamin A. The serum nonessential amino acid to essential amino-acid ratio in the BL and NC Groups increased without a concomitant change in either of the control groups. [7 tables, 5 references]</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 9 PAGE 7 (over)</p>	<p>0.7</p> <p>SYMPOSIUM ON THE CHEMICAL ASPECTS OF NUTRITION NEEDS</p> <p>[Authors and titles listed below] Journal of Agricultural and Food Chemistry <u>20</u>, No. 3, 455-537 (May-June 1972)</p> <p>Card A</p> <p>The various reports in this Symposium deal with new developments in the structure or metabolic function of vitamin and amino-acid nutrients, or to their deficiency states in man; the domestic and foreign problems in human nutrition; and the medical vs agricultural aspects of current nutritional problems. The papers are as follows:</p> <p>"Introduction," by Myron Brin (Hoffmann-La Roche, Inc., Nutley, NJ 07110), p. 455.</p> <p>"Carotenoid Vitamin A Precursors and Analogs in Foods and Feeds," by J. C. Bauernfeind (Chemical Research Department, Hoffmann-La Roche, Inc., Nutley, NJ 07110), pp. 456-473. [5 figures, 5 tables, 243 references]</p> <p>"Mechanism of Action of Vitamin A in Differentiation of Mucus-Secreting Epithelia," by Luigi De Luca and George Wolf (Dept. of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139), pp. 474-476. [1 table, 19 references]</p> <p>"Vitamin E. Regulation of the Biosynthesis of Porphyrins and Heme," by Padmanabhan P. Nair, Hari S. Murty, Priscilla I. Casati, Sherry K. Brooks, and Jeffrey Quartner (Biochemistry Research Division, Dept. of Medicine, Sinai Hospital of Baltimore, Inc., Baltimore, MD 21215), pp. 476-480. [7 figures, 8 tables, 13 references]</p> <p>"Vitamin E. The Biological and Environmental Antioxidant," by Daniel B. Menzel (Duke University Medical Center, Durham, NC 27706), Jeffery N. Roehm, and Si Duk Lee, pp. 481-486. [6 figures, 5 tables, 32 references]</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 9 PAGE 7 (over)</p>



- "Protective Effect of Vitamin E on Plasma Lipid Dienes in Man," by Nicholas R. Di Luzio (Dept. of Physiology, Tulane University School of Medicine, New Orleans, LA 70112), pp. 486-490. [5 figures, 2 tables, 25 references]
- "Role of Thiamine Triphosphate in Subacute Necrotizing Encephalomyelopathy," by Jack R. Cooper and Jonathan H. Pincus (Yale University School of Medicine, New Haven, CT 06510), pp. 490-493. [1 figure, 4 tables, 20 references]
- "Interconversions of Vitamin B<sub>6</sub> in Mammalian Tissue," by Ernest E. McCoy and Carlo Colombini (University of Alberta School of Medicine, Edmonton, Alberta, Canada), pp. 494-498. [7 figures, 1 table, 22 references]
- "Normal and Pathological Conditions Which May Alter the Human Requirement for Vitamin B<sub>6</sub>," by R. R. Brown (University of Wisconsin Medical School, Madison, WI 53706), pp. 498-505. [14 figures, 1 table, 63 references]
- "Nitrogen Balance and Plasma Aminogram in Measuring Supplemental Effect of Amino Acids for Children," by George G. Graham, Juan M. Baertl, and Robert P. Placko (Baltimore City Hospitals and School of Medicine, Johns Hopkins University, Baltimore, MD.), pp. 506-508. [3 figures, 3 tables, 13 references]
- "The Probyte: A New Protein Unit System," by Harold L. Rice and Andrew H. Pettifor (Dept. of Industrial Engineering, Stanford University, Stanford, CA 94305), pp. 509-518.

The authors propose and describe the use of a new fundamental unit for protein. This unit, called a Probyte, is defined as one calorie composed of the eight essential amino acids required by the adult human in the gram-pattern of the protein of whole egg. A second term, the Probit, is proposed to account for the essential amino acids left over as fractional Probytes. The mathematical procedure for deriving the Probyte content of foods and of diets is described. In addition,

[Continued on Card B]

#### EFFECT OF COOKING ON SELENIUM CONTENT OF FOODS

- Higgs, Darla J., Virginia C. Morris, and Orville A. Levander (Human Nutrition Research Division, ARS, U.S. Department of Agriculture, Beltsville, MD 20705) *Journal of Agricultural and Food Chemistry* 20, No. 3, 678-680 (May-June 1972)

Although selenium shows toxic properties, it does, also, have beneficial nutritional value when present in the diet in trace amounts. Because there is no published information on the effect of cooking foods on their selenium content, the study examined the influence of various cooking and heating treatments on the selenium content of some of the foodstuffs of the American diet. The heat treatments and foodstuffs involved included the drying of breakfast cereals, the boiling of cereals and grainproducts, the frying of eggs, the boiling of mushrooms and asparagus, the baking of chicken meat and flounder fillets, and the broiling of lamb chops, pork chops, and T-bone steak.

There was little or no loss of selenium as a result of boiling of cereals, frying of eggs, baking of flounder, and broiling of meats. Dry heating of certain breakfast cereals (the cereals were dried overnight at 100° C. in an electric oven) resulted in a 7 to 23% loss of selenium in the foodstuffs. Asparagus and mushrooms, boiled 20 min. in distilled water, lost 29% and 44% selenium, respectively. It was concluded that the major sources of selenium in the American diet (cereal products, eggs, seafoods, and meat) do not lose appreciable amounts of selenium when cooked by the ordinary methods.

[5 tables, 20 references]

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- "Foods of the Future," by Aaron M. Altschul (Office of Nutrition, Agency for International Development, Washington, DC 20523), and Irwin Hornstein (Office of the Secretary, U.S. Department of Agriculture, Washington, DC 20250), pp. 532-537.

Future foods will be handled better, will be cleaner, and will have better quality and flavor than at present. Greater flexibility in choice of raw materials (including flavors and protein sources) will be available. Selection of food ingredients on a day-to-day basis will be made by computer, producing least cost standard products of high nutritional value and palatability. Foods will be engineered to be nutritionally complete and use of convenience foods will increase.

[15 references]

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ally prepared in a non-standard way (e.g. fried eggs).

The energy value, fat, protein and iron content of meals and complete day's diets prepared by large-scale catering methods for "Meals on Wheels," a convalescent home, a Nurses' home and the galley of a seagoing merchant ship were measured analytically. The results obtained were compared with values calculated using food composition tables. Wide differences were found between calculated and analytical values especially for fat and iron and for certain foods that are generally prepared in a non-standard way (e.g. fried eggs).

BMCRA Abstracts 25, No. 6, Abstract No. 2045, 414 (June 1972)

Stock, A. L., and E. F. Wheeler

Br. J. Nutr. 27, No. 2, 439-448 (1972)

#### FROM FOOD TABLES

#### EVALUATION OF MEALS COOKED BY LARGE-SCALE METHODS: A COMPARISON OF CHEMICAL ANALYSIS AND CALCULATION

0.7

- "Nutrification: A Concept for Assuring Nutritional Quality by Primary Intervention in Feeding Systems," by Paul A. Lachance (Dept. of Food Science, Rutgers University, New Brunswick, NJ 08903), pp. 522-525.

The assurance of adequate nutrition on the basis of a balanced intake of commodity foods is impractical. This is so because an increasing share of the American diet is derived from prepared convenience foods of varying nutritional value. Such foods may have already undergone restoration, enrichment, fortification, or all three. Man's food tastes, food fashions, and dietary habits can not be relied upon as a sound guide to nutrition. Nutrification of selected foods (that is, to make them completely nutritious) would help foster good nutrition community wide.

Foods intended for meal replacements and foods which provide 7% or more calories as utilizable protein should be considered for proportionate nutrification with the NAS/NRC Recommended Dietary Allowance nutrients. The author recommends nutrification on the basis of protein rather than calories because (1) biochemically, micronutrients are related to protein metabolism or the formation of protein tissues, (2) the caloric consumption of protein is more constant than the total caloric consumption, and (3) the percent of each Recommended Dietary Allowance nutrient in a typical planned menu more closely approximates the percent protein than it does percent calories.

[1 figure, 1 table, 20 references]

"Use of Specific Micronutrients Intervention for Treatment of Malnutrition," by

Jack L. Smith and Walter G. Unglaub (School of Medicine, Tulane University, New Orleans, LA 70112), pp. 526-531.

[Continued on Card C]



0.7  
(0.4)

THE STATUS OF NUTRITION IN THE UNITED STATES

Babcock, M. J. (Department of Food Science, Rutgers University, New Brunswick, NJ 08903)  
Food Product Development 6, No. 4, 56, 58, 60, 62, 64, 67, 86 (June-July 1972)

In determining the nutritional status of individuals three types of data are useful: food consumption studies, chemical analysis of bodyfluids, and physical examinations. All three are expensive to obtain, incomplete, and subject to error in interpretation.

The U.S. Department of Agriculture made a nationwide food consumption survey in 1955 covering 6,000 households. Another survey in 1965 covered 15,000 households. The nutrients calculated from the household diets were compared with the table of Recommended Dietary Allowances (RDA). The RDA classifies diets as "good," "fair," and "poor." In comparing data from the 1955 survey with that of 1965, the proportion of good diets decreased from 60% to 50%. Poor diets increased from 15 to 21%. The incidence of poor diets was similar for rural and urban populations.

Income was related to quality of diet. However, more than one-third of households with incomes above \$10,000 had diets that failed to meet the RDA for one or more nutrients. Of households with incomes below \$3,000, 37% had diets that satisfied the RDA.

Protein intake increased slightly from 1955 to 1965 because of increased meat consumption. Calcium dropped due to lower consumption of milk: only 70% of the diets met the RDA in 1965. Iron intake was good in 1965. Three nutrients--calcium, vitamin A and C--were examined in more detail. Calcium was low in the

(over)

0.7  
(0.4)

THE STATUS OF NUTRITION IN THE UNITED STATES

Babcock, M. J. (Department of Food Science, Rutgers University, New Brunswick, NJ 08903)  
Food Product Development 6, No. 4, 56, 58, 60, 62, 64, 67, 86 (June-July 1972)

Card B

Riboflavin in casual urine samples was twice as low in children under 17 as in adults, and low levels were twice as common for negroes as for other ethnic groups.

Low heights and weights among children tested were twice as prevalent as in normal children in Iowa. More children below poverty line had retarded growth than children above the poverty line.

The author concludes that there is no formula for calculating nutritional status. He suggests that there is a national nutritional problem which can be solved only by coordinated efforts of farmers, the food industry, consumers, educators, and the government. [8 figures, 3 tables, 9 references] SW

1.126  
(9.125)  
(1.0152)

POPULATION STUDY OF YELLOWFIN TUNA IN THE WATERS ADJACENT TO TAIWAN

Yang, Rong-Tszong (Institute of Oceanography, National Taiwan University, Taipei, Taiwan, Republic of China)  
Acta Oceanographica Taiwanica No. 1, 137-155 (Dec. 1971)

The yellowfin tuna fishery, one of the most important of Taiwan, is divided into a deep-sea and an inshore fishery. The deep-sea fishery uses longline boats of 50 to 3,400 tons operating as far out as the southwest Pacific, the Indian Ocean, and the Atlantic Ocean. The inshore fishery operates in the waters adjacent to Taiwan, extending from the Bashi Channel through the Sulu, Celebes, and Banda Seas with longline boats below 50 tons. The base port of the fishery is Kaohsiung.

Previous reports have indicated variability in the morphometrical features of yellowfin samples taken from the northwest Pacific and from yellowfin samples taken from the equatorial Pacific. Other data indicated that the length-weight relationship of yellowfins in the waters southwest of Taiwan is different from those in the eastern equatorial Pacific, and the scale size is different from that of western Pacific and Atlantic specimens. Because the yellowfin fishery is important, studies were made to ascertain whether or not the yellowfin caught by the inshore longline boats is distinct from yellowfin of the western Pacific. The study was based on morphometric measurements using covariance analysis, generalized distance function analysis, and catch statistics. The morphometrical characteristics used were head length and size of scale from the body portion just below the sixth dorsal finlet counted from the tail. Specimens were

2.05  
(0.5)

INTERRELATIONSHIP OF HEAT AND RELATIVE HUMIDITY IN THE DESTRUCTION OF CLOSTRIDIUM BOTULINUM TYPE E SPORES ON WHITEFISH CHUBS

Pace, Paul J., Edward R. Krumbiegel, and Henry J. Wisniewski (Milwaukee Health Department, Milwaukee, WI 53202)  
Applied Microbiology 23, No. 4, 750-757 (Apr. 1972)

Earlier work showed that whitefish chubs, commercially smoked at 82.2° C. (180° F.) for 30 min., contained (in about 1% of the fish samples) C. botulinum type E spores. Inasmuch as the organism, reportedly, has a low tolerance to heat, the reason for this unexpected result was not apparent. However, other workers found that smoked whitefish chubs commercially heat-processed in an atmosphere of 100% relative humidity showed no C. botulinum type E spores. W. G. Murrell and W. J. Scott [J. Gen. Microbiol. 43, 411-425 (1966)] found that spores of C. botulinum type E were most resistant to heat at aw (water activity) of from 0.2 to 0.4. The present authors surmised that the persistence of spores of C. botulinum in smoked whitefish chubs may be related to the relative humidity of the atmosphere in which they are heat smoked. The study examined the relationship between temperature, time, and relative humidity in the destruction of spores of C. botulinum during heat processing and smoking of whitefish chubs.

An electronically controlled environmental test chamber was used that exposed the fish to the desired temperatures and relative humidities; test conditions were set up to simulate those used in commercial whitefish smoking plants. Spores of C. botulinum type E were inoculated into the loin muscle of the fish or were introduced on the surface of the fish. The timing of the exposure of the fish started



Baldrige, H. David, Jr. (Mote Marine Laboratory, 9501 Blind Pass Road, Sarasota, FL 33581)  
Copeia, No. 2, 306-325 (June 8, 1972)

Maneuverability required by predatory sharks in capturing agile prey depends on the relation between submerged body weight and area of lifting surfaces--the pectoral fins. Density of the shark's body fluctuates with its content of water and liver oil, and water accounts for about 80% of white muscle tissue weight. At such high values, a slight variation in water percentage is indicative of either uptake or loss of a substantial weight of water in a large shark. Liver oil varies from an almost negligible fraction of total weight in some juveniles up to about 25% of the weight of certain adults. In addition, liver oil in sea water provides about five to six times the buoyancy of an equal weight of solute free water. Based on analysis of data on body weight, liver weight, and area of pectoral fins the author concludes that buoyancy control holds priority over lipid reserve as a function of liver oil in large sharks. Primarily as a result of buoyancy provided by liver, the loading of hydrodynamic lifting surfaces in mature sharks is maintained within narrow limits. Deterioration of hydrostatic and/or hydrodynamic equilibrium is expected to adversely affect a shark's ability to capture food and might be a factor in leading the animal to seek relatively helpless prey at sea.

The author suggests, as possible reasons for the hydrostatic balance of a shark, as such as in a static condition, that the hydrodynamic lift in a shark which is in a static condition is due to the hydrodynamic lift in a shark which is in a static condition. The hydrodynamic lift in a shark which is in a static condition is due to the hydrodynamic lift in a shark which is in a static condition.

[7 figures, 2 tables, 24 references]

MS

diets of rural families (32%) and slightly higher in urban families (25%). Vitamin A was deficient in 76% of rural diets and 70% in urban diets. Vitamin C was deficient in 75% of rural diets and 60% in urban diets.

Food consumption (for a 24-hr. period) of 141 individuals of all ages was studied in 1965. Children under 2 and all females over 8 years of age were deficient in iron. The latter were also deficient in calcium, thiamine, and riboflavin. Men 55 and older were deficient in calcium. The U.S. Department of Health Education and Welfare surveyed (in 1968-1970) nutrition of low income families (nonfarm poverty line - \$3,355 per year) in 10 states and New York City. The study included 83,000 persons in 23,000 households and was based on food consumption data, clinical examinations of one-half the sample, and urine analysis of one-fourth of the sample. The dietary standard was similar to RDA. Data for five states has currently been released. About 39% of persons above and 32% below the poverty line met the dietary standard. Infants, adolescents, and aged people below the poverty line were vulnerable. Diets of infants and adolescents (10-16 years of age) were low in iron and vitamin C. The diet of 25% of people 60 and older contained less than half the required calories and was low in vitamins A and C. Blood hemoglobin was deficient in 5% and iron in 25% of people below the poverty line, and low in 10% above poverty line. Of all children under 10 years of age, 6% were deficient in hemoglobin. One-third of all negroes were low or deficient and 6% were deficient in hemoglobin. Plasma vitamin A was deficient in only 6% of persons tested, but rose to 15% in children under 10 years of age. Only 6% of the people were low in vitamin C.

[8 Card punchout]

when the desired interval temperature was reached in each fish in the experiment. When the inoculated whitefish chubs contained low numbers of spores of *C. botulinum* type E, the spores were destroyed within 30 min. on the fish held at an internal temperature of 82° C. (179.6° F.) in an atmosphere of at least 70% relative humidity. When the inoculated whitefish chubs contained high numbers (several hundred thousand) of spores of the organism, the spores were destroyed regularly within 30 min. at an internal temperature of 82° C. and at a minimum relative humidity of 70%. When the whitefish chubs were heated in an atmosphere of 70% relative humidity, the spores were reduced to 2 to 4 by 2 log<sub>10</sub> at 77° C. (170.6° F.), by 5 to 6 log<sub>10</sub> at 82° C. (179.6° F.), and by more than 6 log<sub>10</sub> at 88° C. (190.4° F.). In a separate test with spores of *C. botulinum* type B, a 5 to 9 to logarithmic reduction of spores was obtained when the inoculated whitefish chubs were processed at 82° C. (179.6° F.) in an atmosphere of 70% relative humidity. The results demonstrated that the effectiveness of heat in destroying spores of *C. botulinum* type B and type E depends directly on the relative humidity of the atmosphere in which the fish are processed.

[3 figures, 5 tables, 19 references]

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This invention can be used to detect iron or steel foreign bodies in food-stuffs which are shielded by a non-ferric metal container, e.g. aluminium foil.

Reprinted

# FERROMAGNETIC METAL DETECTOR

Loma Engineering Ltd. (D. W. Pascoe and G. Mayo) (pat.)  
British Patent 1,270,821  
BRIEF ABSTRACTS 25, No. 6, Abstract No. 2316, 468 (June 1972)

0.8

(2510.1)(521.6) 921.1

collected from waters adjacent to Taiwan, equatorial Pacific, and the Indian Ocean. Measurements and collection of scales were made on specimens drawn from fish landed at the fish markets of Kaohsiung and Tungkang from April through November 1970. Only specimens with a fork length of 100 to 150 mm. were selected for comparison.

The data collected in the study indicated that yellowfin taken in the waters adjacent to Taiwan are significantly different from those taken in the Indian Ocean. The differences in morphometric data on yellowfin taken from the waters adjacent to Taiwan and those taken from the equatorial Pacific are so small that the determinations whether or not they form a single population could not be made. In addition, examination of the hooking rates along with morphometric data indicates that there is a group distributed in the waters around the Philippines and the Sulu and Celebes Seas distinct from a group in the waters around New Guinea and the Solomon Islands.

[52 references]

This apparatus is designed to deliver fish headfirst in a single file to cutting or other processing operations. It may be used for small fish (herring, pilchards, anchovies) or for large fish (menhaden, cod, salmon).

FTP

## FISH HANDLING METHOD AND APPARATUS

Szymanski, Chester, and Albert J. Ballentine (San Jose, Calif.); assignors to FMC Corporation of Delaware (pat.)

U.S. Patent 3,561,041 (Feb. 9, 1971)

2.3



Anonymous

Fishing News No. 3075, 6-7, 12 (June 2, 1972)

The new 118-foot stern trawler, Boston Sea Dart, owned by a Lowestoft fishing firm is an advanced design for near water trawlers.

The fishing industry recognized that for boats over 130 ft. stern trawler layout has advantages over the conventional trawler in terms of safety and easier working methods. A suitable design for boats between 100 and 130 ft. in length has been in question. The Boston Sea Dart was designed to be a medium-size stern trawler so that the factors of safety and less manual labor would be incorporated. The basic design was developed by the White Fish Authority Industrial Development Unit. The ship has a single screw, an overall length of 117 ft. 9 in., an LBP of 101 ft., a beam of 26 ft. 10 in., a molded depth of 15 ft., a gross tonnage of 311.76, and a net tonnage of 108.50. She has a round bilge form with a block coefficient of 0.50, a raked soft nose bow, and a transom stern incorporating a small stern ramp. A fixed Kort nozzle is fitted. Below deck the vessel is subdivided into forepeak, engine room, fishroom, fish handling room, and steering gear compartment. There is a deep double bottom below the fishroom and fish handling room, and the fresh-water tank is below the forward end of the engine room. The superstructure containing bridge and crew's quarters extends from midships forward, and the trawl deck extends from midships aft.

The main engine is a four stroke, in line, six-cylinder diesel with a continuous rating of 1095 b.h.p. at 750 r.p.m. Housed in a 6 ft. 6 in. diameter fixed nozzle is the three-bladed, bronze, controllable pitch propeller. It is driven (over)

DISTRIBUTION OF FORAGE OF SKIPJACK TUNA (EUTHYNNUS PELAMIS)  
IN THE EASTERN TROPICAL PACIFIC

Blackburn, Maurice (Institute of Marine Resources, Scripps Institution of Oceanography, University of California at San Diego, P.O. Box 109, La Jolla, CA 92037), and R. Michael Laurs (National Marine Fisheries Service, Fishery-Oceanography Center, P.O. Box 271, La Jolla, CA 92037)

NOAA Technical Report NMFS SSRF-649, 16 pp. (Jan. 1972). For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 0320-0036, Price \$0.30.

Most of the fishery for skipjack tuna (E. pelamis) in the eastern tropical Pacific lies within a few hundred miles of the American coast. Skipjack taken in these waters are probably adolescents of a migratory population which breeds in the central Pacific and is not being fully exploited.

The U.S. tuna fishery in the eastern Pacific may become increasingly dependent upon skipjack because the tuna fleet is growing and the fishery for yellowfin (Thunnus albacares) is regulated. Other than skipjack there is no equally available and commercially marketable species. The fishery has not been able to yield more than 265 million pounds (120,200 metric tons) from the coastal areas in any one year since 1966 and the yearly catch has been as low as 127 million pounds (57,600 metric tons). Thus, new fishing grounds are needed and could become available if offshore areas of skipjack abundance were known. Because of proximity to the spawning grounds some of these offshore areas may yield larger fish than are taken near the coast. Larger fish are better suited to canning.

The U.S. tuna fleet would benefit from information on unfished offshore regions of the eastern tropical Pacific abundant with skipjack. The cooperative (over)

LIQUID NITROGEN FREEZING COUNTERS RISING LABOR,  
RAW MATERIAL COSTS

Kliver, A. N., and J. T. Sills (Air Products and Chemicals Inc., Allentown, Pa.) Quick Frozen Foods 34, No. 11, 55-57, 84 (June 1972)

Liquid nitrogen freezing systems are being used commercially to freeze certain meat and poultry products. In the basic countercurrent heat exchange setup, the food passes through successively colder nitrogen gas recirculation zones, a liquid nitrogen vaporization zone, and air equilibrium zone. Production rates range from about 300 to 4,000 pounds of food product per hour. Modern liquid nitrogen freezing systems are almost completely automatic.

The advantages of liquid nitrogen freezing systems are as follows: (1) The initial investment is comparatively small; (2) the labor required for operating the system is small; (3) the maintenance requirements are low; and (4) the weight loss of product during the freezing process is relatively small. [1 illustration]

FTP

EFFECTS OF DRESSING AND COOKING ON DDT CONCENTRATIONS  
IN CERTAIN FISH FROM LAKE MICHIGAN

Reinert, Robert E., Donald Stewart, and Harry L. Seagrán (U.S. Fish and Wildlife Service, Great Lakes Fishery Laboratory, Ann Arbor, MI 48107) Journal of the Fisheries Research Board of Canada 29, No. 5, 525-529 (May 1972)

The purpose of this study was to obtain information on the distribution of DDT residues in certain fish from Lake Michigan and to determine the effects of different methods of processing and cooking on the DDT levels in these fish. This paper reports specifically on (1) the effects of dressing on the DDT residue content--the concentration of DDT was measured in different parts of the body of yellow perch (Perca flavescens), bloaters (Coregonus hoyi), lake trout (Salvelinus namaycush), and coho salmon (Oncorhynchus kisutch). (2) the effects of brining and smoking on concentrations of DDT residues in bloaters, and (3) the effects of frying, baking, and broiling on the concentrations of DDT residues in bloaters and yellow perch.

The levels of DDT residues were highest in the parts of the body of the fishes with the highest oil contents. Dressing of the yellow perch (removing viscera and heads) reduced the DDT residues and oil content (as compared to the whole fish) by more than 90%, but dressing had little effect on the relative oil content (between the dressed and whole fish) of the other three species. The level of DDT residues in the bloaters was effected little by the smoking process but was reduced by the other methods of cooking--from 8.0 p.p.m. in the raw fish to 2 p.p.m. after frying the fish in corn oil; from 10.7 p.p.m. to 3.9 p.p.m. after frying the fish in lard; and from 9.1 p.p.m. to 3.2 p.p.m. after broiling the fish. The level of DDT residues in the fillets of yellow perch went from 0.3 p.p.m. (raw) to 0.4 or 0.5 p.p.m. (over)



2.8 (9.19)

after baking, frying, or broiling the fish.

The parts of the fish that had the highest level of DDT residues also contained the highest concentrations of oil. Because the distribution of oil in the body parts of the fish varies among the species, a method of dressing and cleaning may reduce the comparative level of DDT residues in one species but not in another. In the yellow perch most of the oil is located in the offal, thus the fillets (edible portion) would contain a comparative lower level of DDT residues. This situation does not apply to bloaters, coho salmon, and lake trout, because the oil in these fishes is more evenly distributed throughout the body. Trimming off the fatty areas along the back (dorsal section), lateral line, and belly of fillets and steaks of coho salmon and lake trout would remove those areas containing the more concentrated amounts of DDT residues. Losses of DDT residues on cooking was generally proportional to the amount of oil (where the higher levels of DDT residues are located) lost.

[1 figure, 4 tables, 3 references]

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This shrimp processing machine has a shell separating station in which a spiked unit engages the meat and moves ahead at a slightly faster rate than does the shell of the shrimp. This action partially separates the meat from the shell. Then, the spikes back up as the shell continues ahead, thus the meat and shell are pulled apart.

2.3 Jonsen, Gregor (Highland Park, IL 60035) (pat.)  
U.S. Patent 3,566,437 (Mar. 2, 1972)

## SHRIMP PROCESSING MACHINE AND METHOD

2.3 HSI FAYND FVCTORY MEAL ANOTHR NORWON (5.1) 21.2

Anonymous

Fishing News International June 11, '69, No. 13 (June 1967)

Blue whiting is one of the under-used species in the North Atlantic area. Large shoals of this fish have been found by the Norwegian research ship G. O. Sars about 100 miles off Iceland, east of the Faeroe Islands and at depths of 200 to 250 fathoms west of Ireland. The blue whiting is related to the cod and haddock. It is pelagic but does not concentrate on the surface in sufficient quantities to be accessible to purse seiners. Blue whiting reaches maturity at an age of 2 to 4 years and 20-cm. length. Spawning is pelagic but deep and, in the northeast Atlantic, beyond the continental shelf. Growth is rapid during the first 2 years; and in maturity the fish reaches a length of 40 cm.

Reports from British research groups indicated the blue whiting to be soft fleshed and of excellent flavor. The scales are easily rubbed off in the trawl with the result that the keeping quality is not good.

British fishermen have not been attracted to these fish stocks, but the slump in major winter and summer fisheries in Norway has aroused interest in this potential fishery. Two commercial trawlers were sent out from Norway to test fish the stocks of blue whiting. They took more fish than they could handle, their nets breaking under the strain of the heavy catches. Concentrations of fish were found in depths of about 200 fathoms.

The Norwegian fishing industry has been slow because of conservation measures taken to protect stocks of the better known fish. With the advent of the blue whiting stocks activity in the industry should pick up.

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(521.1) 21.2

EASTROPAC Oceanographic Expedition of 1967-1968, coordinated by the National Marine Fisheries Service, extracted such information from collected data. The expedition found that skipjack group where food is abundant in waters ranging in temperature from 20° to 29° C.

The prey of skipjack includes several active pelagic fishes, cephalopods, and crustaceans about 1 to 10 cm. in size. This collection of forage is called micronet. The EASTROPAC cruises examined net-caught micronet samples taken over a large area of the eastern tropical Pacific. In the region from long. 92° to 119° W. major areas of maximum concentration of potential skipjack forage remained essentially constant. Two of the areas lie parallel to the equatorial upwelling zone. Other areas of abundant forage occur generally between lat. 6° N. and 10° N., lat. 10° N. and 19° W. These concentrations of forage are comparable with the nearshore areas of the present skipjack fishery.

Abundance of skipjack at the new offshore locations might therefore be sufficient to support large-scale operations. This conclusion is reinforced by later reports of skipjack caught with little effort by trolling or live-bait fishing in the same area.

[References: 1. Jones, G. E., 1968, p. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

This apparatus separates the head portion from the edible body portions of whole shrimp.

FTP

2.3 Gruber, William J. (P.O. Box 904, Grand Isle, LA 70350) (pat.)  
U.S. Patent 3,665,556 (May 30, 1972)

## SHRIMP DEHEADING MACHINE

511.2

The present invention relates to a machine for separating the head portion from the edible body portions of whole shrimp. The machine includes a hopper for receiving whole shrimp, a conveyor for moving the shrimp from the hopper to a cutting station, and a cutting station for cutting the shrimp into head and body portions. The cutting station includes a pair of rotating knives which cut the shrimp into head and body portions. The head portions are then moved to a collection bin, and the body portions are moved to another collection bin.

The machine is designed to be operated by a single operator. The machine is also designed to be operated by a single operator. The machine is also designed to be operated by a single operator.

[54] 81

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This apparatus consists of three components; a fish-beheading mechanism, a fish-cleaning mechanism, and a mechanism for transferring the fish between the two operations. The apparatus is suited for beheading and cleaning fish of moderate size, particularly salmon.

FTP

2.3 U.S. Patent 3,670,363 (June 20, 1972)

## FISH BEHEADING AND CLEANING APPARATUS

Hogan, Elmer R., and John I. Simpson; assignors to Smith-Berger Mfg. Corp., Seattle, Wash.) (pat.)



Sacharow, Stanley (East Orange, N.J.)

Food Product Development 6, No. 4, 40-41, 43 (June-July 1972)

Packaging materials should be selected for the following characteristics: ability to withstand normal and severe handling and shipping; ability to feed through package assembly machinery rapidly without difficulty; compatible with product to prevent undesirable changes in the product induced by the packaging material or changes in the material induced by the product; impermeable to gas and vapor, and resistant to cracking or tearing.

Test procedures are available to identify materials and measure their properties and to evaluate the packaged product. These procedures are published by the American Society for Testing Materials (ASTM), Technical Association of the Pulp and Paper Industry (TAPPI), the Packaging Institute (PI), National Flexible Packaging Association (NFPA), and American Boxboard Association (ABA). In addition, spot test procedures used to identify packaging compounds are summarized by F. Feigl, Spot Tests in Organic Analysis (5th ed., 1956), Elsevier Press.

An example of the use of a spot test is in the identification of polyvinylidene chloride (PVDC) coatings. PVDC coatings are applied on plastic films to upgrade their inherent gas-moisture barrier. To detect a PVDC coating, a drop of morpholine is placed on the surface of the film. If PVDC is present a brown-black color will appear in the spot.

Plastic films may be identified by tests for solubility in various solvents and by exposure to flame to observe burning and odor characteristics. Films also exhibit specific absorbance when exposed to the infrared spectrum. An example of (over)

Put, Henriette M. C., H. Van Doren, W. R. Warner, and J. Th. Kruiswijk (Carle C. Conway Laboratory, Thomassen and Drijver-Verblifa N. V., Deventer, The Netherlands)  
Journal of Applied Bacteriology 35, No. 1, 7-27 (Mar. 1972)

The preservation of foods by canning is based on two principles first defined by Nicolas Appert (1749-1841): (1) the food is conditioned in a container which is sealed and impenetrable to liquids, gases, and microorganisms; (2) the sealed container is subjected to heat or any other permissible treatment in such a manner as to destroy or inactivate enzymes, microorganisms and their toxins, the presence or propagation of which might cause the food to deteriorate or render it unfit for human consumption.

The canning operation may fail in two respects. First, if the sealed container is not subjected to sufficient heat the contents are not effectively sterilized and so spoil on storage. This type of spoilage is due to underprocessing. The second type of spoilage results when the contents of the can which were effectively sterilized are subsequently reinfected by microorganisms from the surrounding environment that gained access to the contents through leaks in the sealed container. This type of spoilage is called leaker spoilage. A study was made of leaker spoilage to determine the mechanism and other problems involved. Results of the study showed important factors that contribute to reinfestation of canned foods. These factors are: (1) the mechanical construction of the can; (2) the diameter, profile, shape and length of the leakage path, and the capillary action (over)

Sampugna, Joseph, Leslye Johnson, Kermit Bachman, and Mark Keeney (Department of Chemistry, University of Maryland, College Park, MD 20742)  
Lipids 7, No. 5, 339-343 (May 1972)

Earlier work has dealt with gross composition of oyster tissue and a few studies on sterol components, glycolipids, and fatty acid composition. This paper reports data on the distribution of plasmalogens among the major fractions of oyster lipid, and the distribution of phosphorus among the polar lipids obtained from the tissue of the oyster. [A plasmalogen is a phosphatide that is a precursor of plasma in tissue. A phosphatide is a lipid substance occurring in cellular structures and contains esters of phosphoric acid. Plasmal is a substance containing Table 1

Lipid material	Weight %	Phosphorus		Aldehyde	
		µg./mg. of the lipid	% of total phosphorus	µmoles/mg. of the lipid	% of total aldehyde
Total lipid extract	2.4(a)	10	--	0.139	--
Neutral lipid fraction	58 (b)	0.08	0.5	0.080	28.3
Glycolipid fraction	6 (b)	2.3	2.1	0.068	3.0
Polar lipid fraction	36 (b)	24	97.4	0.272	68.7

(a) Based on wet weight of oyster tissue.

(b) Based on lipid recovered after chromatography.

Idler, D. R., and P. Wiseman (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 4, 385-398 (Apr. 1972)

This review covers published work on identification of mollusc sterols, isolation of new marine sterols, biosynthesis, variation in sterol content, and hypocholesterolemic effects exhibited by certain sterols of bivalves. Also, data obtained before the advent of gas-liquid and thin-layer chromatography and mass spectrometry are discussed, where possible, in relation to studies made using modern techniques.

The small and primitive classes (and extremely rare) Monoplaophora and Scaphopoda (tooth shells or tusk shells) have not been investigated for sterols. Also, the wormlike molluscs from the subclass Aplousobranchia (class Amphineura) and the highly specialized pelecypods of the subclass Septibranchia have not been studied. The Polyplacophora (class Amphineura) contain  $\Delta^7$ -cholestenol and sometimes in addition contain cholesterol and brassicasterol.

Chitons (class Amphineura) characteristically show a predominance of  $\Delta^7$ -cholestenol and recent work indicates that certain species contain mixtures of  $\Delta^7$ - and  $\Delta^5$ -sterols. The Pelecypods (molluscs) show the most varied and complex sterols of all the molluscs. With few exceptions, cholesterol is the principal sterol in the molluscs, but as many as 13 sterols may be present in one species. Other major sterols of the Pelecypods are 24-methylenecholesterol, brassicasterol, and 22-dehydrocholesterol. Sterols of Gastropods are predominantly cholesterol and (over)



in this passageway and within the adjacent regions of the double seam; (3) the number of bacteria contained in the liquid around the cooled wet can and trapped in the outerpart of the double seam, the motility of the bacteria, their ability to multiply, and their multiplication rate; (4) the time during which the double seam is wetted by the contaminated liquid; (5) the viscosity of the contaminated liquid; (6) the reversible and nonreversible deformations of the double seam by small repeated blows or hard single impacts of the can while it is wetted with contaminated liquid; (7) subatmospheric pressure inside the can after sterilization and cooling; (8) sudden pressure fluctuations outside the can during sterilization and cooling.

To reduce the incidence of bacterial infection the following principles should be practiced: (1) avoid rough handling of cans; (2) avoid contamination of cans; (3) ensure that construction of cans is done to accepted standards; (4) ensure that cooling and sterilization are done to accepted standards; (5) ensure that the residual level of free chlorine is 1.0-2.0 mg/l of the water drained from the cans after cooling; (6) ensure that cans are free of free chlorine; (7) ensure that the double seam is free of free chlorine; (8) ensure that the double seam is free of free chlorine; (9) ensure that the double seam is free of free chlorine; (10) ensure that the double seam is free of free chlorine.

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Sometimes its precursor, desmosterol. Cephalopods probably contain cholesterol. Sterols recently identified in the sea scallop are 22-trans-24-norcholesta-5,22-dien-3 $\beta$ -ol, and 29-methylisofucosterol (neither of these compounds have been found elsewhere in nature).

There seems to be considerable variations in the sterol content of molluscs. Molluscs contain hypocholesterolemic sterols. Many pelecypods and herbivorous gastropods are able to synthesize sterols.

[2 figures, 3 tables, 17 references]

DLH

of trimethylamine and hence formaldehyde and methylamine. D.M.L.

Reprinted

A series of five experiments was carried out which involved the subjection of methylamine oxide to very varied conditions, and the results indicated that it was a very stable compound which only underwent direct fission into formaldehyde and dimethylamine under drastic conditions favouring thermal decomposition. However its reduction product, trimethylamine, was less stable and underwent conversion to formaldehyde and methylamine. The results obtained confirm reports that the formation of formaldehyde in stored shrimp occurs through the agency of oxygen acceptors in the fish tissue which provide conditions necessary for the formation of trimethylamine and hence formaldehyde and methylamine. D.M.L.

Sundsvold, O. C. et al.  
J. Ass. publ. Analysts 9, No. 3, 86-95 (1971)  
BEMIRA Abstracts 25, No. 1, Abstract No. 74, 16 (Jan. 1972)

### 3.30 THE DEGRADATION OF TRIMETHYLAMINE OXIDE TO METHYLAMINES AND FORMALDEHYDE IN CANNED SHRIMPS

6174

one or more aldehydes of the type related to palmitic acid and stearic acid obtained in the form of an acetal.

The lipids were extracted from the homogenized oyster tissue with a methanol-chloroform mixture. Total lipid was separated into three fractions by chromatography on Biosil V. In the elution scheme chloroform was used to elute the neutral lipids; acetone was used to collect the glycolipid fraction; and methanol was used to elute the polar lipids. The lipid, phosphorus, and aldehyde content of total lipid extract and lipid fractions are shown in table 1. Table 2 shows the phosphorus distribution among the polar lipids of the oyster tissue.

Table 2

Class of phospholipid	Phosphorus content					
	Total			As phosphate		
	A	B	Total	C	D	E
Diacyl	1.22	9.01	10.23	0.52	3.8	1.7
Glycerol	9.19	20.2	29.39	8.04	6.9	14.94
Phosphatidyl	0.88	2.82	3.70	20.2	12.8	33.0
Plasmalogen	1.22	40.7	41.92	9.59	38.1	47.69
Sphingolipid	0.88	2.82	3.70	11.1	14.8	25.9
% of each class of phospholipid						
	1.22	9.01	10.23	0.52	3.8	1.7
	2.99	20.2	23.19	8.04	6.9	14.94
	8.22	28.2	36.42	20.2	12.8	33.0
	9.5	40.7	50.2	9.59	38.1	47.69
				11.1	14.8	25.9

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4.19 LIPID COMPOSITION OF THE QUEEN CRAB (CHIONOECETES OPILIO) (8.53)

Addison, R. F. (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada), R. G. Ackman, and J. Hingley (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, N.S.) Journal of the Fisheries Research Board of Canada 29, No. 4, 407-411 (Apr. 1972)

The muscle tissue of the queen crab contained 0.75% lipid of which 78.8% was phospholipid (mainly choline phosphatides) and the rest mainly cholesterol; the viscera contained 13.6% lipid, mostly triglyceride. The distribution of the lipid classes in the lipid of the queen crab is shown in the accompanying table.

The lipids of the queen crab are generally similar to those of other marine species. The

Lipid class	Content of lipid class as % of the total lipid of queen crab:	
	Muscle	Viscera
Hydrocarbons	0.6	1.4
Sterol esters	0.4	
Triglycerides	7.3	91.3(a)
Free fatty acids	3.8	
Sterols	10.1	3.8
Cardiolipin	3.8	trace
Cephalins	22.1	1.1
Lecithins	49.1	2.4
Sphingomyelins	3.8	

(a) Also includes a small amount of diacyl glyceryl ethers.

(over)

6.1 1972 FEEDSTUFFS ANALYSIS TABLE (6.19)(6.55)

Hubbell, Charles H. (Arlington Heights, Ill.) Feedstuffs 44, No. 26, 30-31 (June 26, 1972)

The table is a convenient summary of the latest information concerning the analysis of various feed ingredients. (It may be obtained from the Feedstuffs Reader Service Dept., P.O. Box 67, Minneapolis, MN 55440. Single copy--\$0.50; 2 to 9 copies--\$0.30 each; and 10 or more copies--\$0.25 each.) The percentage of protein, fat, fiber, calcium, phosphorus, and ash of each ingredient is shown. The calories per pound of productive and metabolizable energy derived from each ingredient are listed for poultry. Also listed are total digestible nutrients percent for ruminants. Of the vitamins, riboflavin, niacin, pantothenic acid, and choline are shown in milligrams per pound. Arginine, lysine, methionine, cystine, tryptophan, and glycine are the amino acids listed in percentages.

The feed ingredients include: grains--whole and byproducts; oilseed meals; byproducts from citrus, baking, sugar refining, dairy and brewer's processing; meals from alfalfa, fish, shrimp, meat, and yeast.

An accompanying table contains the calcium and phosphorus content of several types of bone meal, various phosphates, gypsum, limestone, and oyster shell. The nutrient table has values for additional amino acids.

[4 tables]

SW

6.190 UNIDENTIFIED FACTORS IN TURKEY NUTRITION AFFECTING HATCHABILITY AND PROGENY GROWTH

Touchburn, S. P., V. D. Chamberlin, and E. C. Naber (Department of Poultry Science, Ohio Agricultural Research and Development Center, Wooster, OH 44691) Poultry Science 51, No. 1, 96-103 (Jan. 1972)

Unknown growth factors exist in a variety of feedstuffs that are required for optimum performance of poultry. The purpose of the present research work was to study the factors that affect the response of turkeys to unidentified factors in the breeder diet. A series of six experiments was carried out over a period of 6 years. These experiments were designed to determine the effect of rearing conditions, breeder housing conditions, and diet composition on the hatchability of eggs and growth of poult due to transfer of unknown dietary factors from the breeder hen diet.

Simplified starter, grower, finisher, and breeder diets were developed for this study. These diets were composed of corn, soybean meal, and pure sources of vitamins and minerals. They provided nutrients in excess of required amounts but were devoid of those ingredients commonly considered as sources of unidentified factors. These simplified diets were tested against complete diets (regular Ohio turkey diets) which contained sources of animal protein and unidentified factors. Female poult of a medium white variety were used. Oyster shell was available in the breeder pens (free choice basis).

The results provide substantial evidence for the existence of an unidentified nutrient or nutrients in fish meal and dried fish solubles required by the (over)

6.190

GROWTH AND PLASMA AMINO ACID PATTERN OF CHICKS FED FISH MEAL AS SOLE SOURCE PROTEIN: EFFECT OF DIETARY LEVELS OF CHLORIDE, SULFATE, GLUTAMIC ACID AND METHIONINE

Miller, David, Joseph H. Soares, Jr., and Marion Sanders (National Center for Fish Protein Concentrate, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, College Park, MD 20740) Poultry Science 51, No. 1, 171-177 (Jan. 1972)

Two experiments were conducted with chicks fed fish meal as sole source protein from day 1 to day 21 to determine the effect (1) of lowered dietary chloride and sulfate content, (2) of additions of glutamic acid, and (3) of methionine on the growth response and on the plasma free amino-acid pattern. These treatments produced characteristic effects on growth and the amino acid concentration in the plasma, indicating complex interactions. Decreasing the chloride and sulfate in a diet containing 12% protein supplied entirely by a fish meal produced a significant positive growth response which was apparently due to the resulting increased availability of arginine and increased concentration in the plasma. Supplemental glutamic acid (5.05%) to the suboptimal 12% protein diet resulted in an increase in plasma glutamic acid and alanine, but increased growth occurred only when the diet also contained the higher level of chloride and sulfate. The addition of glutamic acid decreased the plasma concentration of threonine, serine, tyrosine, and phenylalanine.

Methionine additions failed to increase growth unless glutamic acid was also included in the diet with the lower chloride and sulfate content. The 0.2% methionine supplement with glutamic acid produced a growth response and an increase in (over)



AVAILABILITY OF THE AMINO ACIDS IN CASEIN, FISH MEAL, SOYA PROTEIN, AND ZEIN AS MEASURED IN THE CHICKEN

Filipot, Paul, Rene J. Belzile, and G. J. Brisson (Fac. Agric., Univ. Laval, Quebec, Que., Canada)  
Chemical Abstracts 76, No. 15, 84718v (Apr. 10, 1972)

DLA

to and of the amino acids in casein, fish meal, soya protein, and zein as measured in the chicken. The results showed that the availability of the amino acids in casein, fish meal, soya protein, and zein was high, and that the availability of the amino acids in casein, fish meal, soya protein, and zein was high.

STUDIES OF SALMONELLA POTENTIAL IN CATFISH FEEDS

Love, Travis D., and Brenda H. Minkler (Fishery Extension Service, National Marine Fisheries Service, Pascagoula, MI 39567)  
Commercial Fisheries Review 34, Nos. 5-6, 49-50 (May-June 1972)

Eighteen samples of catfish feeds used in U.S. Southeast, which included 14 brand names, have been analyzed by standard bacteriological methods for the presence of salmonellae.

Each of 18 samples taken from 50-pound bags was divided into six 50-gm portions for inoculation into tetrathionate broth. After 24 hours, the broth was streaked on Bismuth Sulfite agar and Salmonella-Shigella agar. A considerable number of large mucoid swarming colonies were noted on the Salmonella-Shigella agar, but scanty growth was noted on the Bismuth Sulfite agar. Most of the large mucoid colonies appeared to be Proteus on further culture.

No true salmonellae could be confirmed on further selective media culture and by serological methods.

Although a limited number of samples were examined, it appears that catfish feeds are relatively free from salmonellae.

Authors' abstract

Authors' abstract

CONSECUTIVE CHROMATOGRAPHIC TECHNIQUES IN THE COMPONENT FATTY ACID ANALYSIS OF SARDINE OIL

Gedam, P. H., M. R. Subbaram, and J. S. Aggarwal  
Fette Seifen Anstrichmittel 73, No. 12, 748-753 (1971) (In English)  
BFIIRA Abstracts 25, No. 3, Abstract No. 689, 141 (Mar. 1972)

GAS CHROMATOGRAPHY AND ITS USE FOR ANALYZING FATTY ACIDS

Sneegireva, I. A. (U.S.S.R.)  
Chemical Abstracts 76, No. 15, 83062q (Apr. 10, 1972)

DLA

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EVIDENCE FOR SULFATE AS AN UNIDENTIFIED GROWTH FACTOR IN FISH SOLUBLES

Hinton, and R. H. Harms (Department of Poultry Science, Florida Agricultural Experiment Station, Gainesville, FL 32601)  
Poultry Science 51, No. 2, 151-155 (Mar. 1972)

Previous studies indicated that fish solubles were valuable additions to poultry diets. The value of fish solubles was attributed to an unidentified growth factor. In other words, the need for inorganic sulfur in fish solubles was demonstrated. However, the need for inorganic sulfur in fish solubles was demonstrated. However, the need for inorganic sulfur in fish solubles was demonstrated.

DLA



McLeod, Harry A., and Patricia J. Wales (Department of National Health and Welfare, Tunney's Pasture, Ottawa, Ontario, Canada)  
Journal of Agricultural and Food Chemistry 20, No. 3, 624-627 (May-June 1972)

This article describes a low-temperature cleanup procedure for separating polar and apolar pesticide residues from sample lipids, waxes, and water in a single step. The procedure does not require partition systems and drying agents.

The procedure consists of extracting the samples by refluxing with an acetone-benzene (19 + 1) mixture and cleaning of the extracts by low-temperature precipitation at -78° C. Optimum conditions included a precipitation time of 30 min. followed by filtration through Solka Floc (cellulose). The recovery of polar residues was adversely affected by the water content of the extract but was not affected by the presence of carbon in the Solka Floc filtration pad. This cleanup procedure (low-temperature precipitation of the water, fat, and waxes in the acetone-benzene extracts) gave a supernatant satisfactory for gic determination with electron capture and flame photometric detectors.

Recovery tests were made of 13 representative insecticides, fungicides, and herbicides (captan, diazinon, dinitrobutyl phenol anisol, 2,4-D acid, 2,4-D isopropyl ester, endosulfan, malathion, malaoxon, parathion, paraoxon, phosphamidon, fenitrothion, and fenitrothion) added singly or in combination to samples of carrots, peas, wheat, human fat, liver, and kidney. The recoveries ranged from 80 to 116%.  
[1 figure, 5 tables, 13 references]

7.81  
QUANTITATIVE AND SELECTIVE GAS CHROMATOGRAPHIC ANALYSIS OF DIMETHYL- AND TRIMETHYLAMINE IN FISH

Miller, Alexander, III, Richard A. Scanlan, Jong S. Lee, and Leonard M. Libbey (Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331)  
Journal of Agricultural and Food Chemistry 20, No. 3, 709-711 (May-June 1972)

Earlier work has shown that dimethylamine (DMA) is characteristically the principle methylamine produced in frozen fish of the Gadoid species. Furthermore, the presence of N-dimethylnitrosamine was demonstrated in smoke-processed marine fish (sablefish, salmon, shad); apparently, the DMA and nitrite served as precursors for the carcinogenic nitroso derivative.

In the course of studies on the gas chromatographic analysis of methylamines, several workers have found that columns containing Graphon (a partially graphitized carbon black) coated with tetraethylenepentamine (TEP) gave symmetrical peaks for methylamine, DMA, and TMA, with good resolution. In the present study, the authors examined further the detection and separation of methylamines using Graphon and TEP in conjunction with an alkali flame ionization detector (AFID) that was sensitive and selective to nitrogen compounds. They described, in this article, rapid analytical procedures for quantitative and qualitative determination of methylamines in fish, as well as other food products or biological materials.

Selective gas chromatographic separation of methylamines was achieved using columns containing Graphon and tetraethylenepentamine with an alkali flame ionization detector. "Spiked" samples of fish (the chemicals were added in amounts

(over)

## 7.85

## EFFECT OF TYPE OF ENRICHMENT AND DURATION OF INCUBATION ON SALMONELLA RECOVERY FROM MEAT-AND-BONE MEAL

Huhtanen, C. N., and J. Naghski (Eastern Regional Research Laboratory, Marketing and Nutrition Research Division, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, PA 19118)  
Applied Microbiology 23, No. 3, 578-585 (Mar. 1972)

Tetrathionate enrichment media is recommended for isolating salmonellae from meat-and-bone meal [Appl. Microbiol. 16, 1387-1393 (1968)]. Both tetrathionate and selenite-cysteine enrichment is recommended by the Food Protection Committee (National Academy of Sciences) for isolating salmonellae from foods [Reference methods for the microbiological examination of foods, NAS, Washington, D.C. (1971)]. The committee also suggests incubating the enrichment samples from 18 to 24 hours. The Food and Drug Administration [Bacteriological Analytical Manual, ed. 2, U.S. FDA, Washington, D.C. (1969)] recommends the use of both enrichment media for isolating salmonellae from animal feeds. In the present study, the authors compared the efficacy of selenite-cysteine and tetrathionate enrichment media (incubated at 1 and at 2 days) for isolating serogroups of salmonellae from naturally contaminated meat-and-bone meal samples.

Twenty-five samples of meat-and-bone meal were collected from commercial rendering plants; seven had been found to be positive for salmonella previously; of the remaining 18 samples, 16 were positive for salmonella. The samples were enriched with either selenite-cysteine or tetrathionate media and incubated for 1 and for 2 days.

(over)

7.86  
(0.5)

## EFFICIENCY OF SALMONELLA ISOLATION FROM MEAT-AND-BONE MEAL OF ONE 300-G SAMPLE VERSUS TEN 30-G SAMPLES

Huhtanen, C. N., J. Naghski, and E. S. Dellamonica (Eastern Regional Research Laboratory, U.S. Department of Agriculture, Philadelphia, PA 19118)  
Applied Microbiology 23, No. 4, 688-692 (Apr. 1972)

Sample sizes of from 20 to 30 g. have been proposed by various government research and service agencies for isolating salmonellae from foods and feeds. In this study, the efficacy of isolating salmonellae from meat-and-bone meal was examined using one 300-g. sample versus using ten 30-g. samples. Twenty-five meat-and-bone samples were used. The organisms were cultured in selenite-cysteine broth and the inoculated broth samples were cultured on Brilliant Green agar plates; preliminary confirmation was made using lysine-iron agar slants, and final confirmation was made by slide agglutination tests using grouped and individual somatic antisera.

When the 300-g. samples were used, 17 meat-and-bone meal samples were positive for salmonellae; when the 30-g. samples were used, 18 meat-and-bone meal samples were positive (the difference was not significant). The 300-g. sample of meal showed a significantly higher ( $P < 0.01$ ) percentage of confirmed salmonellae at 2 days of incubation than at 1 day of incubation. The 30-g. samples showed significantly fewer confirmed salmonella than did the 300-g. sample after 2 days of incubation, but there was no difference after 1 day of incubation. A total of 1,417 presumptive colonies were picked from the Brilliant Green agar plates; of these, 1,215 (85.7%) were lysine decarboxylase-positive and 1,152 (81.3%) were agglutinated by one of the somatic antisera. The large and the small samples

(over)





Price, W. R., R. A. Olsen, and J. E. Hunter (Winton Hill Technical Center, The Procter & Gamble Company, Cincinnati, Ohio)  
Applied Microbiology 23, No. 4, 679-682 (Apr. 1972)

Positive results of tests for Salmonella in samples of food ingredients and products are relatively rare. Therefore, a test procedure that would give a single negative result for many negative samples would save considerable time and effort on the part of the analyst. This study involved the examination of the effectiveness of pooling pre-enrichment broth cultures for screening multiple food cultures. The tests were carried out using samples of nonfat dry milk, egg albumin, and cocoa. Pooled samples were prepared by combining nine 25-g. Salmonella-negative samples and one 25-g. Salmonella inoculated sample together in a single jar containing 2.250 ml. of pre-enrichment broth (0.5% lactose broth for all foods except nonfat dry milk for which sterile distilled water containing 0.002% Brilliant Green was used). Pooled pre-enrichment broth cultures were prepared by first combining the individual sample and enrichment broth, then pooling the pre-enrichment broth cultures into single enrichment broths. The pre-enrichment broths of the Salmonella-inoculated samples were analyzed individually and after pooling with pre-enrichments of uninoculated samples. The subsequent procedures for Salmonella analysis were the same for both sets of samples and were in accordance with those described in the Bacteriological Analytical Manual [Department of Health, Education and Welfare, Food and Drug Administration, Washington, D.C. (1969)].

7.9  
(9.19) TISSUE CULTURE BIOASSAY METHOD FOR WATER POLLUTION  
WITH SPECIAL REFERENCE TO MERCURIC CHLORIDE

Li, M. F., and G. S. Traxler (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
Journal of the Fisheries Research Board of Canada 29, No. 5, 501-505 (May 1972)

Bioassay methods involving fish exposure and oxygen residual tests and chemical methods for determining pollutants have been proposed for monitoring water quality. However, the bioassay methods are laborious and time consuming and their sensitivity varies with the species and condition of the fish used. Chemical methods consider only a particular pollutant and cannot completely replace the bioassay method. A rapid and effective method of monitoring water quality is urgently needed. This paper reports on the effect of mercuric chloride on cellular respiration and multiplication and on those factors that govern the sensitivity of this bioassay system. Mercury and its derivatives have been implicated in serious pollution problems involving aquatic animals; mercuric chloride was used in these experiments as the representative mercuric compound.

In the cell culture and growth assay tests, mouse cells (L-cells, clone 929) were cultivated in 50-ml. spinner flasks, and the experimental system described by M. F. Li and coworkers [J. Fish. Res. Bd. Canada 26, 1378-1382 (1969)] and Can. J. Zool. 48, 133-136 (1970) was used. Also, cell respiration studies were carried out at 37° C.

The nutritional history, the growth phase, and initial density of the cells, and the concentration of the serum supplement used in the test medium, had significant effects on the sensitivity of tissue culture bioassay system. Mercuric

Windom, Herbert L., and Ralph G. Smith (Skidaway Institute of Oceanography, Savannah, GA 31406)  
Journal of the Fisheries Research Board of Canada 29, No. 4, 450-452 (Apr. 1972)

Fifty oysters were collected along the coast of Georgia representing different environmental conditions. The shells and the soft tissues of the oysters were analyzed for iron, magnesium, copper, zinc, and silver. It is known that bivalve molluscs (and other marine organisms) can concentrate heavy metals from the environment.

Magnesium was the only metal of the five analyzed that was concentrated in the shell. In the soft tissues, it appears that iron and magnesium are concentrated similarly, and that copper, zinc, and silver are concentrated similarly. The data seem to indicate that the concentration of the metals by the oysters is more affected by the geochemistry of the metals than by the biochemistry of the metals. The ranges of heavy metals found in the oyster shells were: Fe, 12 to 79 p.p.m.; Mn, 33 to 121 p.p.m.; Zn, 1.5 to 8.1 p.p.m.; and Cu and Ag less than 1 p.p.m. The ranges for heavy metals found in the soft tissue of the oysters were: Fe, 233 to 738 p.p.m.; Mn, 24 to 51 p.p.m.; Cu, 48 to 261 p.p.m.; Zn, 0.12 to 0.57 p.p.m.; and Ag, 28 to 82 p.p.m.

[1 table, 5 references]

8.53  
(0.35) TRIACYLGLYCEROLS CHARACTERISTIC OF PORPOISE ACOUSTIC TISSUES:  
MOLECULAR STRUCTURES OF DIISOVALEROYLGLYCERIDES

Varanasi, Usha (Department of Chemistry, Seattle University, Seattle, WA 98122), and Donald C. Malins (National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 2725 Montlake Blvd. East, Seattle, WA 98102)  
Science 176, No. 4037, 926-927 (May 26, 1972)

Data are presented on the individual triacylglycerols from the melon and mandibular canal tissues of the porpoise (Tursiops gilli)--see table that follows. Diisovaleroylglycerides comprised more than two-thirds of the total triacylglycerols of these acoustic tissues of the porpoise; blubber triacylglycerols (which have no acoustic function) did not contain a detectable amount of these unusual glycerides. Because diisovaleroylisopentadecanoylglycerol was the major component in melon and mandibular canal tissues, the authors believe that it may play an important role in the transmission of sound through the lipid-protein matrices. They suggest that a study of the acoustical properties (compressibility, acoustical impedance) of diisovaleroylisopentadecanoylglycerol may provide additional clues to the role of branched-chain triacylglycerols in the construction of porpoise tissues involved in biosonar.



chloride at a concentration of 10 mg./liter inhibited multiplication of L-cells significantly (under the experimental conditions used). The authors suggest that this assay procedure could be adequate for monitoring water quality.

The cellular respiration method was less sensitive than the cell culture and growth assay method, but it was simple and rapid (results were available in a few hours); therefore, the cellular respiration method may be useful for screening or the preliminary testing of heavily polluted samples.

FTP

[5 figures, 1 table, 13 references]

Air is blown through the sample of oil at room temperature and the escaping air current containing the solvent is passed into Dräger indicator tubes for petroleum solvents or trichlorethylene. The amount of solvent is read off directly from the tube by measurement of the length of the coloured zone in the tube. The method takes 15 minutes and can detect levels down to 0.01%. It is accurate enough for practical purposes. C.S.B.

Reprinted

#### 7.9 A RAPID METHOD FOR THE DETERMINATION OF SOLVENT RESIDUES (6.137) IN EXTRACTED OILS

(5'0) 98 7

Individual solvent residues could be pooled for analysis with a pre-enrichment broth culture as compared to individual samples. The sensitivity of detection was as low as 0.01 mg. per gram of sample. The procedure was effective and it offers a way to increase sample size and to reduce the number of samples.

Individual solvent residues could be pooled for analysis with a pre-enrichment broth culture as compared to individual samples. The sensitivity of detection was as low as 0.01 mg. per gram of sample. The procedure was effective and it offers a way to increase sample size and to reduce the number of samples.

d.f.

[References 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

Total mercury was determined by flameless atomic absorption spectrophotometry and methyl mercury by electron capture gas chromatography. Details of these methods are given. The results obtained on 50 samples of tuna of diverse origin are tabulated and their significance is discussed. C.C.

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#### 7.42 DETERMINATION OF TOTAL MERCURY AND OF METHYL MERCURY (9.19) IN CANNED FISH PRODUCTS. RESULTS AND CONSIDERATIONS

Fabbrini, A. et al.

Boll. Chim. Prov. 22, No. 3, 339-349 (1971) (In Italian)  
BEMIRA Abstracts 25, No. 6, Abstract No. 1963, 397 (June 1972)

## 8.53 (0.35)

Chain length of acid	Triacylglycerols containing 2 moles of isovaleric acid from the acoustic tissues of the porpoise. (a)			
	Melon tissue		Mandibular canal tissue	
	Acids (b) derived from triacylglycerols	Diiso-valeroyl-glycerides	Acids (b) derived from triacylglycerols	Diiso-valeroyl-glycerides
12:0 iso	0.3	0.8 (d)	0.2	0.2 (d)
12:0	0.2		0.3	
13:0 iso	0.4	3.0 (d)	0.3	1.5 (d)
13:0	0.3		0.4	
14:0 iso	2.5	6.7	3.7	10.3
14:0	3.2		4.9	12.4
15:0 iso	16.8	49.0	12.5	35.2
15:0	1.5	5.8	4.4	14.9
16:0 iso	3.7	11.1	4.7	15.6
16:0	2.4	10.9	0.5	2.4
18:1	1.3	5.3	1.6	6.8

(a) Values are in mole %  
(b) Contains 65.9 mole % isovaleric acid  
(c) Contains 66.2 mole % isovaleric acid  
(d) Not separable

[1 figure, 1 table, 11 references]

FTP

## 7.8

#### DETERMINATION OF NITROSODIMETHYLAMINE IN THE LOW PARTS PER BILLION

Newell, John E., and Harold R. Sisken (Uniroyal Chemical, Naugatuck, CT 06770)  
Journal of Agricultural and Food Chemistry 20, No. 3, 711-713 (May-June 1972)

This article describes a method for the analysis of nitrosodimethylamine (NDMA) in raw apples, cooked apples, and milk. The method is sensitive to 3 p.p.b. of NDMA and the recovery is 70% or better. The method involves five operations as follows: (1) The NDMA and other volatile components are removed from the non-volatile components of the sample by a vacuum distillation technique; (2) the NDMA, including other organic materials, in the distillate is removed from the water by percolation through a column of polymer beads; (3) the NDMA is removed from the polymer beads by heat and carried into a gas chromatographic column; (4) the NDMA is separated from the other components by means of programmed temperature gas chromatography; and (5) the NDMA is reduced, catalytically, to ammonia and the ammonia is microcoulometrically titrated and continuously recorded. The amount of NDMA is established by the area of a peak at a specific retention time.

The authors suggest that the method should be applicable to the determination of other volatile nitrosamines. Also, the use of the polymer beads to accumulate a few parts per billion of organic compounds from large volumes of water might be applicable in water pollution analysis.

[4 figures, 1 table, 8 references]

FTP



Gambell, Ray (National Institute of Oceanography, London, England)  
New Scientist 54, No. 801, 674-676 (June 22, 1972)

The International Whaling Convention, signed in 1946, set up the International Whaling Commission (IWC) to regulate the industry and to provide for the development, conservation, and optimum utilization of the whale resources. The IWC decided recently on new catch quotas, size limits, and other regulations which will govern the hunting of the large whales next year.

The aim of the IWC now is to bring all stocks to levels which will provide long-term maximum sustainable yields. Whale populations at different stock sizes and compositions have varying rates of recruitment and mortality. In an unfished stable population there is a surplus of recruits over natural mortalities, and this surplus can be harvested indefinitely without causing a reduction or increase. At a stock size generally of half the unexploited population, the surplus reaches a peak called the maximum sustainable yield (MSY). Populations smaller than the MSY stock level have a sustainable yield (SY) less than maximum. To allow this stock to rebuild, fewer than the SY must be caught.

In exploited populations, increased food availability is probably a prime factor responsible for the raised level of recruitment. A further demonstrable factor in greater recruitment rate is the reduction in age of sexual maturity. The following species are the most depleted and are protected from hunting by countries party to the International Convention: right whales, protected since 1935 and believed to be increasing in numbers; gray whales, protected since 1947, stabilized at a level of 11,000 in the eastern North Pacific; blue whales, protected (over)

Willis, D. E., and R. F. Addison (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada)  
Journal of the Fisheries Research Board of Canada 29, No. 5, 592-595 (May 1972)

The major components of Aroclor 1221, a polychlorinated biphenyl mixture, are shown in the table.

The authors indicate that a report by R. G. Webb and A. C. McCall [identities of polychlorinated biphenyl (PCB) isomers, presented at the 162nd Meeting of the American Chemical Society, Washington, D.C. (1971)] lists qualitative data on

Aroclor 1221 that includes the components found by the present authors as well as some other trichlorobiphenyls. [1 figure, 2 tables, 13 references]

Component	Amount of component in Aroclor 1221
Biphenyl	wt. (%)
2-chlorobiphenyl	12.7
4-chlorobiphenyl	28.4
2,2'-dichlorobiphenyl	18.7
2,4'-dichlorobiphenyl	9.2
2,4'-dichlorobiphenyl	3.5
4,4'-dichlorobiphenyl	13.6
4,4'-dichlorobiphenyl	6.2
Total Aroclor accounted for	92.3
Calculated amount of Cl	19.6

FTP

Sanders, Herman O., and Jack H. Chandler (Fish-Pesticide Research Laboratory, Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, Columbia, Mo.)  
Bulletin of Environmental Contamination and Toxicology 7, No. 5, 257-263 (May 1972)

Polychlorinated biphenyls (PCBs) are mixtures of chlorinated biphenyl isomers having a wide range of industrial application. Previous studies on PCBs have reported on widespread contamination of the environment, on their insecticidal properties, and on their harm to organisms in aquatic ecosystems. In addition, PCBs can be accumulated by aquatic invertebrates from the aquatic environment containing low levels of PCBs. Thus higher organisms which ingest aquatic invertebrates may be exposed to significant amounts of PCBs via the food chain.

To determine the rate of accumulation and biological magnification of PCBs, eight species of aquatic invertebrates were exposed to PCBs with labeled  $^{36}\text{Cl}$ .

The levels of PCBs in the medium were less than 3 p.p.b., a concentration similar to that in Escambia Bay, Fla. In addition to measurements of accumulation, samples of scud (*Gammarus pseudolimnacus* Bousfield) were analyzed by gas-liquid chromatography to investigate metabolism of PCBs.

The organisms tested were four species of crustacea--scud, glass shrimp (*Palaemonetes kadiakensis* Rathbun), crayfish (*Orconectes nais* Faxon), a daphnid (*Daphnia magna* Strauss); and four species of immature aquatic insects--stonefly naiad (*Pteronarcys dorsata* Say), dobsonfly larvae (*Corydalus cornutus* Linnaeus), mosquito (over)

Johnson, Conwell W. (National Renderers Association, Des Plaines, Ill.)  
Feedstuffs 44, No. 27, 29 (July 3, 1972)

[Polychlorinated biphenyls (PCBs) are industrial chemicals widely distributed in the environment. They degrade very slowly and tend to accumulate in the food chain. Small doses can be toxic.]

Poor hatchability and high chick mortality were reported in the late summer and early fall of 1971 by poultry producers in the southeastern United States. An investigation into the causes found the toxic factor to be a shipment of fish meal accidentally contaminated with PCBs (or Aroclors). Poultry feed ingredient suppliers initiated PCB surveys to determine the extent of contamination in their products. Analysis of samples of feed ingredients from all parts of the country indicated an average PCBs contamination range of 0.09 to 0.55 p.p.m. One sample from the central United States had 2.50 p.p.m. This sample had been processed through a terminal heater where PCBs were the heat exchanger fluid. A second survey for PCBs in feed ingredients confirmed the results of the first, although levels were slightly lower.

Average PCB levels in several ingredients are as follows (in p.p.m.): hydrolyzed feather meal, 0.25; meat and bone meal, 0.09; fats and greases, 0.26. Six samples of feed ingredients held since 1965-1966 were tested for PCBs with the following results (in p.p.m.): poultry byproduct meal, 0.06; feather meal (light), 0.06; poultry fat, 0.25; blood meal, 0.04; feather meal (dark), 0.12, meat and (over)



9.19 MERCURY IN CANADIAN FISH

Bilgh, E. G.  
Can. Inst. Fd Sci. Technol. J. 5, No. 1, A6-A14 (1972)  
BEMIRA Abstracts 25, No. 5, Abstract No. 1698, 345 (May 1972)

The mercury content of a number of fish from certain Canadian rivers and lakes was surveyed. The U.S. consumption of mercury in such applications as the paint industry, agriculture, pulp and paper making industry, and the presence of mercury in the aquatic food chain are considered in this study. It is concluded that the problems of mercury pollution in Canadian waters are relatively serious.  
S.M.S.

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[References 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 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2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 221



# THE PREPARATION OF ARTICLE 1 OF THE CONVENTION ON THE CONTINENTAL SHELF

Oxman, Bernard H. (U.S. Department of State, Washington, D.C.)  
Journal of Maritime Law and Commerce 3, No. 2, 245-305 (Jan. 1972)

This paper is an examination of the background of Article 1 of the Convention on the Continental Shelf as revealed by the official records of the International Law Commission and the 1958 United Nations Conference on the Law of the Sea. Articles 1 and 2 of the Convention are as follows (The two articles have a textual and historical bearing upon each other):

## Article 1

"For the purpose of these articles, the term 'continental shelf' is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; (a) to the seabed and subsoil of similar submarine areas adjacent to the coast of islands.

## Article 2

1. The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.

2. The rights referred to in paragraph 1 of this article are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal state.

(over)

# 9.3 SEABED BOUNDARIES BETWEEN COASTAL STATES: THE EFFECT TO BE GIVEN ISLETS AS "SPECIAL CIRCUMSTANCES"

Ely, Northcutt (Washington, D.C.)

International Lawyer 6, No. 2, 219-236 (Apr. 1972)

This paper is concerned with the effect to be given small islets in the determination of seabed boundaries (1) between coastal States that are adjacent to one another on the same coast or (2) between coastal States which occupy opposing coasts. The basic question involved is whether a State which owns a little island off its mainland coast or the coast of its neighbor may demand that the coast of its islet, rather than its mainland, be the baseline from which the seabed boundary shall be computed, as against that neighbor. This problem may arise in the demarcation of median or equidistance lines. The subject is discussed under the following areas: The Problem; The Nature of Rights in the Seabed and Subsoil; Baselines and Equidistance Principle; Treatment of Islets in the Literature; Practice of States; and Guidelines for Solutions.

The author suggests that in those cases in which islets are denied recognition as basepoints for the calculation of a median or equidistance line in the demarcation of seabed boundaries (because of their small size and distance from their owner's major territories) their "special circumstances" can be met by recognizing that another State cannot extend its continental shelf rights into the seabed and subsoil underlying the waters of the islet's contiguous zone; only the State owning that islet can explore and exploit the seabed resources that are within its contiguous (12-mile) zone.

[13 footnotes]

FTP

# FLORIDA'S SEAWARD BOUNDARIES -- A DILEMMA

Scott, Marshall S.

Sea Grant Technical Bulletin No. 20, University of Miami Sea Grant Program-NOAA Sea Grant No. 2-35147 (Jan. 1972), 114 pp. Price \$3.00. Available from Information Services, Sea Grant Institutional Program, University of Miami, Box 9178, Coral Gables, FL 33124.

An important part of this review of a series of disputes between the Federal Government and some coastal states over ownership of the tidelands are the definitions of terms used to describe details of the coast.

The "baseline" follows the mean low-water mark of the shoreline. On the landward side of the baseline lie the "inland waters." On the seaward side of the baseline the "territorial sea" extends, for most states (of the United States), 3 miles out. Most nations exercise some form of jurisdiction over territorial sea to 12 miles seaward of the baseline. In another context the sea between the 3-mile boundary line and the 12-mile line is called the "contiguous sea," and beyond the 12-mile line the "high seas."

One of the earliest cases in regard to coastal lands caused the Supreme Court to rule in 1845 that the individual states owned submerged lands seaward of the inland waters. The Federal Government began to dispute the applicability of this ruling in the 1930's, and claimed ownership of the tidelands. The continuing disputes between the states of California, Texas, and Louisiana and the Federal Government, in the Supreme Court and in the Congress, culminated in the Submerged Lands Act of 1953. This act granted the coastal states ownership and proprietary powers of lands (tidelands) under navigable waters for a distance of 3 miles into the Atlantic and Pacific Oceans and 9 nautical miles in the Gulf of Mexico. Since

# THE LAW OF THE SEA -- BREAKERS AHEAD

Butte, Woodfin L. (University of Texas, Austin, Tex.)  
International Lawyer 6, No. 2, 237-257 (Apr. 1972)

The events leading to and following the United Nations Resolution calling for a Conference on the Law of the Sea some time in 1973 are discussed. The author recommends that this country take and publicize certain positions, some of which are objectively stated as follows: (1) Many of the subjects proposed for the 1973 Law of the Sea Conference are already settled international law. (Possible changes in these settled rules of international law may be discussed; but if changes are not agreed upon, we are not left with no law--the law stands as it is.); (2) It is settled international law that the permissible breadth of the territorial sea of states depends upon international law, not upon unilateral declaration of each coastal state; the maximum breadth of the territorial sea so far accepted in international law is 12 miles; (3) the ocean space outside territorial waters is high seas, with its own particular rules of international law; (4) it is settled international law that each coastal state has sole jurisdiction over resources on and under its continental shelf; this continental shelf may extend to the farthest seaward extension of its continental land mass; and (5) it is believed that the 1958 Geneva Convention on Fishing and Conservation of Living Resources of the High Seas, if adhered to, offers the best means of accommodating the interests of coastal states and distant-water fishing states in conservation of essential fishery resources as a permanent resource for mankind.

[36 footnotes]

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### 9.3 THE 1973 CONFERENCE ON THE LAW OF THE SEA IN THE LIGHT OF CURRENT TRENDS IN STATE SEABED PRACTICE

Auburn, F. M. (Faculty of Law, University of Auckland, Auckland, New Zealand)  
Canadian Bar Review 50, No. 1, 86-109 (Mar. 1972)

The United Nations Conference on the Law of the Sea dealing with a seabed regime and related issues is scheduled to convene in 1973. Because this conference sets an early date for the possible conclusions of a seabed treaty, the author reviews here progress to date with an examination of some current problems of state seabed practice. The report covers the following subject areas: The seabed Committee and the General Assembly, Continental Shelf Delimitations, State Practice in Municipal Law, Red Sea Brines, and Manganese Nodules.

In conclusion, the author states that the Declaration (of the seas and oceans to be the common heritage of mankind) and Moratorium Resolution (Pending the establishment of an international regime, states and persons were bound to refrain from all activities of exploitation of the resources of the seabed and ocean floor and the subsoil thereof beyond the limits of national jurisdiction, and no claim to any part of that area or its resources should be recognized) of the General Assembly of the United Nations of December 1970 represent considerable progress towards an international seabed regime. But, he indicates that much of the debate on the seabed issue has been in the form of draft regimes and protracted quarrels over seats on the Seabed Committee. Furthermore, few states have a clear concept of their own national policy regarding an ocean regime. Exploration and exploitation of the seabed will continue and by 1973 states will have vested interests in petroleum concessions far below 200 meters, in brine (metalliferous) concessions at more than 2,000 meters, and in manganese nodule ventures at 6,000 meters. The author suggests that the conclusion to be drawn by the Seabed Committee is that time is running out. [149 footnotes]

6

3. The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.

4. The natural resources referred to in these articles consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil."

The historical debate concerning the outer limit of coastal state jurisdiction revolved around four separate textual elements of article 1, namely, the term "continental shelf," (2) the word "adjacent," (3) the inclusion of the 200 meter criterion, and (4) the "depth of exploitability."

This study is in three parts; the two remaining parts will be published in April and July issues of this journal.

[61 footnotes]

Reprinted  
The incidence of methyl mercury poisoning throughout the world is well documented with numerous references. C.S.B.

### 9.19 METHYL MERCURY IN THE FOOD CHAIN OF NATURE

Nuorteva, P.  
Naturw. Rdsch., Stuttgart, 24, No. 6, 233-243 (1971) (In German)  
BFMIA Abstracts 25, No. 5, Abstract No. 1700, 345 (May 1972)

### 9.3 EFFECTS OF TRAWLING IN DISCOVERY BAY, WASHINGTON

Reeves, J. E., and G. S. Didonato (State of Washington, Department of Fisheries, Management and Research Division)  
Technical Report No. 8, Washington State Department of Fisheries (Apr. 1972), 45 pp.

Trawl fishery regulations in Discovery Bay, Wash., were changed in November 1967. The changes added fishing periods and opened additional areas to trawling. These changes intensified an existing recreational-commercial fishery conflict. A study was undertaken to provide information that could alleviate the conflict.

The major species comprising the trawl catch are English sole (*Parophrys vetulus*), Pacific cod (*Gadus macrocephalus*), and starry flounder (*Platichthys stellatus*). The average trawl catch of these bottomfish has been 165,000 lbs. annually. The changes in the regulations have resulted in catch increases per unit effort of the commercially caught species. Based on tagging studies and logbook records an effort was made to assess the effects of fishing the English sole, the main groundfish in this fishery. The result of the assessment indicated that the level of trawling effort for English sole has never overfished the stock. Almost all sport fishermen were after salmon (*Oncorhynchus* species), but they expressed concern over depletion of bottomfish species. Sport fishermen were also concerned regarding trawl gear on eel grass beds and discarding of incidental herring (*Clupea pallasi*) found in the nets. Observations revealed that eel grass beds were inshore of the depths fished by the trawl fleet. Fouling of the beaches with discarded fish did not materialize.

The results of the study indicate: (1) The English sole is not being overfished by commercial fishermen, (2) sport fishermen are not in competition with commercial fishermen for any species, (3) these two types of fishing are compatible and (4) optimum utilization of the bottomfish resources of Discovery Bay was made possible. [8 figures, 20 tables, 12 references]

6

The law of 1953, because of the difficulties in establishing the geographical basis for a boundary line (such as a mean low-water mark), no coastal state's seaward boundaries have been completely defined.

Florida has the greatest tidal coastline of any mainland state, approximately 8,426 statute miles. The presence of oil deposits in offshore waters and inland has been confirmed. Consequently the financial future of Florida is joined to a pending lawsuit vis-a-vis the Federal Government which will seek to determine the precise delineation of the seaward boundaries which separate state owned seabed from the continental shelf under Federal control.

The difficulties in determining the seaward boundaries lie in the variety of the bays, islands, swamps, estuaries, flats, tidal currents, and other geographical features of the coast line. In addition, historic court decisions and old U.S. Coast and Geodetic charts may define the boundaries incompletely or incorrectly. Use of this old information for geographical references will tend to increase the controversies.

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MS  
This note is an analysis of the 3-mile territorial sea limit as an existing rule of international law including (1) the historical background of the rule, (2) the international history of the rule, and (3) the influence of the rule upon the international community. The note suggests that we have reached a state where the 3-mile limit has become obsolete, has been abandoned by state practice, and has not retained the general consent which gave rise to its resolution as customary law. [77 footnotes]

### 9.3 THE THREE-MILE LIMIT: ITS JURIDICAL STATUS

Anonymous  
Valparaiso University Law Review 6, No. 2, 170-184 (Winter 1972)



# THE EFFECT OF LOW LEVEL PESTICIDE FEEDING ON THE FERTILITY AND HATCHABILITY OF CHICKEN EGGS

Sauter, E. A., and E. E. Steele (Department of Animal Industries, University of Idaho, Moscow, ID 83843)  
Poultry Science 51, No. 1, 71-76 (Jan. 1972)

White Leghorn hens were fed low levels of pesticides to determine the effects of these chemicals on the fertility and hatchability of the eggs produced. Ninety-six pullets were housed in individual laying cages in this 10-week feeding experiment. Leghorn pullets housed under similar conditions in a separate building were used as controls. The pullets were fed a commercial breeder ration; DDT, Dieldrin, lindane, and malathion were added to the feeds at 0.1, 1.0, or 10.0 p.p.m. levels. Two hatch tests at an interval of 4 weeks were incubated in order to determine the levels of fertility and hatchability prior to feeding the pesticides. Pretest (prior to feeding pesticides) fertility level averaged 95% and hatchability averaged 92% of fertile eggs. The fertility during the experimental period of pesticide feeding ranged from 96.1 to 99.0%. During the experiment, the hatchability of the control test group was 94.1%. All pesticides at the levels used, except malathion at the 0.1 p.p.m. level, significantly reduced hatchability. The thickness of the shell of the eggs produced was reduced by feeding the hens lindane or DDT. DDT reduced the egg production amount of egg production.

[8] tables, 8 references

PLJ

## WORLD'S LARGEST GREEN TURTLE COLONY PROTECTED

(1963)

Anonymous

Marine Pollution Bulletin 3, No. 5, 67-68 (May 1972)

Europa Island, between southern Africa and Madagascar has been declared a maritime national park. The French authorities have acted to protect the world's largest green turtle nesting colony.

Mr. George R. Hughes of the Oceanographic Research Institute, Durban, assisted by the World Wildlife Fund studied the situation of the green turtle in the south-east of Africa. These studies showed the importance of the Island of Europa for the seriously threatened green turtle.

Five new maritime national parks have been established in southern Africa as a result of studies by Mr. Hughes, and four more containing turtle nesting beaches are under consideration.

SW

## ARTIFICIAL REFUGE REEF FOR FISH

9.17  
(9.19)

Ishida, Shinichi (Tokyo, Japan), and Takatsugu Kawano (Asaka-shi, Japan); assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan) (pat.)  
U.S. Patent 2,561,402 (Feb. 9, 1971)

This artificial reef for fish consists of a hollow body (round, triangular, or rectangular) with open ends. The refuge reef body is made of synthetic resins mixed with inorganic substances so that the specific gravity is at least 1.1. FTP

# THE STERN TRAWLER

Hjul, Peter (editor)

Published by Fishing News (Books) Ltd., West Byfleet, Surrey, England (June 1972), Price £8.50, postage 30p.

Anonymous

Fishing News, No. 3075, 11 (June 2, 1972)

This book is a survey of the changes in recent years from side to stern trawlers in the fishing fleets of the world. The subjects deal with the development of the stern trawler; increasing mechanization of gear handling; handling and processing of the catch; notable small stern trawlers; and shelter deck stern trawlers produced in 17 countries since 1963. The text is illustrated by 260 photographs and designs, and contains 21 tables.

SW

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This book is a revision of the 1964 edition with added text and photographs. It contains new techniques and knowledge that have evolved in various parts of the world since the last edition.

SW

Fishing News, No. 3075, 11 (June 2, 1972)

Anonymous

Published by Fishing News (Books) Ltd., 23 Rosemount Ave., West Byfleet, Surrey, England (July 1972), Price £5.50, postage 25p.

## FISH CATCHING METHODS OF THE WORLD

22 PAGE 6 ON 52 TOL SIDVABSTW FISHERIES ABSTRACTS

## THE FISH RESOURCES OF THE OCEAN

Gulland, John (editor)

Published by Fishing News (Books) Ltd., West Byfleet, Surrey, England (June 1972), 288 pp.; Price £10.50, postage 30p.

Anonymous

Fishing News, No. 3075, 11 (June 2, 1972)

This book represents a compilation of the world's total resources in pelagic and demersal fish, molluscan, and crustacean stocks. It was prepared by members of the Fishery Resources staff of the FAO. It treats in detail the catches and stocks in six Atlantic areas, six Pacific areas, the Mediterranean and Black Seas, the Indian Ocean, and the Antarctic area. This book will help in answering questions of fishermen, vessel owners, and processors seeking new resources, species, and underexploited areas.

SW

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This booklet is organized in a question-and-answer format. It is well illustrated. The topics covered include: Legal requirements, Nutritional labeling, Drained weight, and Date and grade labeling.

SW

Food Product Development 6, No. 4, 51 (June-July 1972)

Somers, Ira I. (National Canners Association Research Laboratories)  
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Food Product Development 6, No. 4, 51 (June-July 1972)

## FOOD LABELING

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# Commercial Fisheries Abstracts

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# UNITED STATES DEPARTMENT OF COMMERCE

Peter G. Peterson, *Secretary*

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Robert M. White, *Administrator*

## NATIONAL MARINE FISHERIES SERVICE

Philip M. Roedel, *Director*

### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



Lee, Richard F., and Donald L. Puppione (Scripps Institution of Oceanography, La Jolla, CA 92037)  
Biochimica et Biophysica Acta, Lipids and Lipid Metabolism 270, No. 2, 272-278  
(June 19, 1972)

The physical and chemical properties of the lipoprotein classes of the serum of the Pacific sardine were characterized in order to (1) learn more about the lipid metabolism of an animal that ingests wax esters (from copepods) and (2) to test the possibility that such a diet might result in the presence of long chain alcohols or wax esters in the blood of the fish.

The lipoproteins of the serum of the blood of the Pacific sardine were separated into ultracentrifugal density classes and data were obtained on the lipid compositions of these classes and the fatty acid distributions of cholesteryl esters, triglycerides, and phospholipids. The lipid composition of sardine serum lipoproteins is shown in the table.

The fatty acid composition of the triglycerides from the low-density fraction and the high-density

Compounds	Composition of sardine serum lipoproteins in weight %			
	VLDLF	LDLF	HDLF	Total serum
Cholesterol esters	60	16	20	22
Triglycerides	30	31	10	28
Polar lipids	9	15	15	9
Phospholipids	1	35	55	30
Concentration of lipid in serum in mg./100 ml.	105	121	560	790

Abbreviations used: VLDLF, very low-density lipoprotein fraction; LDLF, low-density lipoprotein fraction; HDLF, high-density lipoprotein fraction.  
Polar lipids group includes cholesterol, free fatty acids, and diglycerides.

Burley, R. W., J. C. Seidel, and J. Gergely (Department of Muscle Research, Boston Biomedical Research Institute; Department of Neurology, Massachusetts General Hospital; and Departments of Neurology and Biological Chemistry, Harvard Medical School, Boston, Mass.)  
Archives of Biochemistry and Biophysics 150, No. 2, 792-796 (June 1972)

One mole of  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ , or  $\text{Mn}^{2+}$  can be bound per monomer of actin; earlier work has shown that replacing one of these cations with another does not change the ability of the actin to polymerize. However, the structure of actin may depend upon the kind of divalent cation combined with it, because differences in the rates of denaturation of  $\text{Ca}^{2+}$ ,  $\text{Mn}^{2+}$ , and  $\text{Mg}^{2+}$  actin have been observed. Previous work has shown that F-actin can be spin labeled with N-(1-oxyl-2,2,6,6-tetramethyl-4-piperidinyl)maleimide without loss of its ability to polymerize or to interact with myosin; polymerization is accompanied by a change in the electron spin resonance (esr) spectrum. Earlier [Arch. Biochem. Biophys. 146, 597 (1971)], the present authors showed that the reaction of the spin label with F-actin is apparently restricted to a single thiol group. Other workers [J. S. Taylor, J. S. Leigh, Jr., and M. Cohn Proc. Natl. Acad. Sci. 64, 219 (1969)] demonstrated a dipolar interaction between  $\text{Mn}^{2+}$  and a spin label bound to creatine kinase resulting in a decrease in the size of the signal of a covalently bound nitroxide spin label. In addition, they have suggested that the magnitude of the decrease can be used to estimate the distance between the  $\text{Mn}^{2+}$  and the spin label [J. S. Leigh, Jr., J. Chem. Phys. 52, 2608 (1970)].

Mirvish, Sidney S., Lawrence Wallace, Michael Eagen, and Philippe Shubik (Eppley Institute for Research in Cancer, University of Nebraska Medical Center, Omaha, NE 68105)  
Science 177, No. 4043, 65-68 (July 7, 1972)

Most N-nitroso derivatives of secondary amines and amides are powerful carcinogens on several species. These derivatives may be produced in the human stomach by the acid-catalyzed reaction between nitrite, which is present in some foods and N-nitrosatable compounds, which may be ingested as drugs at the same time. This possible hazard might be reduced by administering the drug together with a substance which preferentially reacts with and destroys any nitrite occurring in the stomach. Experiments were performed to determine the effectiveness of ascorbic acid for this purpose.

Oxytetracycline was compounded as a mixture containing 80% ascorbic acid and treated with nitrite under conditions used by Lijinsky et al., Analysis and Formation of Nitrosamines, P. Bogovski, editor (International Agency for Research in Cancer, Lyon, France (in press)). No nitration was observed. Further experiments with and without ascorbate confirmed that it almost completely blocked nitrosation. The effect of ascorbate blocking nitrosation was examined in other amines.

Using a 2:1 ratio of ascorbate to nitrite, 98% blocking of nitrosation occurred at all pH values for morpholine and piperazine. Blocking was only partial for N-methylaniline, but it was fairly complete for methyleurea. Blocking was fairly effective for dimethylamine at pH 3 and 4, but at pH 2 there was little effect.

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Frieden, Earl

Scientific American 227, No. 1, 52-57, 59-60 (July 1972)

Until a year or so ago, it was believed that 20 of the 90 naturally occurring elements are essential to life. Since then, four more elements appear to be essential for the growth of small animals; these elements are fluorine, silicon, tin, and vanadium. Nickel, aluminum, and germanium may turn out to be essential. The 20 elements are hydrogen, carbon, nitrogen, oxygen, sodium, magnesium, phosphorus, sulfur, chlorine, potassium, calcium, chromium, manganese, iron, cobalt, copper, zinc, selenium, molybdenum, and iodine. Boron is essential in some plants.

The exact role played by certain of the trace elements is not clear or is not known. The author believes that these gaps in our knowledge could be critical during a period when the biosphere is becoming contaminated by synthetic chemicals and subjected to a potentially harmful redistribution of salts and metal ions.

Furthermore, new and exotic chemical forms (such as methyl mercury) are being discovered, and a complex series of competitive and synergistic relations among mineral salts have been observed.

Hydrogen accounts for 63% of the atoms in the human body; oxygen, 25.5%; carbon, 9.5%; and nitrogen, 1.4%. The remaining 20 essential elements account for less than 0.7% of the atoms in the body.

The functions of the essential elements and the interactions (synergistic and antagonistic) of the various essential metals are discussed. An example of the synergism between elements is the essentiality of copper for the proper metabolism of iron--an animal deprived of copper but not iron develops anemia because the

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0.39  
(0.4)  
RETROGRESSION OF ALCOHOL-INDUCED FATTY LIVER BY TREATMENT  
WITH POLYUNSATURATED FATTY ACID-RICH DIETS

Irsigler, K., K. Kryspin-Ekner, and F. X. Holzogen (I. Med. Universitaets-Klin, Vienna, Austria)  
Chemical Abstracts 76, No. 13, 71343u (Mar. 27, 1972)

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0.4  
LIPID BIOSYNTHESIS AND INCREASE IN ISOVALERIC ACID OF PLASMA

Malins, Donald C. (National Marine Fisheries Service, Northwest Fisheries Center, Seattle, WA 98102), Usha Varanasi (Department of Chemistry, Seattle University, Seattle, WA 98122), and John C. Wekell (National Marine Fisheries Service, Pacific Fisheries Products Center, Seattle, WA 98102)  
Science 176, No. 4041, 1357 (June 23, 1972)

Hypoglycemia is a causative agent of the disease Jamaican vomiting. K. Tanaka, K. J. Iselbacher, and V. Shih [Science 175, 69 (1972)] found that when hypoglycemia is administered to rats their plasma shows an increase in isovaleric acid. This increase, they suggest, resulted from an overloading of the glycine conjugating system. In isovaleric acidemia (a disease with symptoms parallel to those of Jamaican vomiting sickness), the increase in isovaleric acid level in the plasma appears to be due to the inhibition of isovaleryl coenzyme A dehydrogenase. However, the authors suggest that an additional pathway involving lipid biosynthesis may also be operative. They suggest that blocking of the incorporation of the isovaleryl coenzyme A in lipid biosynthesis may be an additional factor in the accumulation of isovaleric acid in the plasma of patients afflicted with Jamaican vomiting sickness or isovaleric acidemia.

FTF [see references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403



0.4  
(4.9)(4.82) NUTRITIONAL FACTORS AFFECTING THE OCCURRENCE OF EXPERIMENTAL ENCEPHALOMALACIA IN CHICKS

Bartov, I., and S. Bornstein (Division of Poultry Science, The Volcani Institute of Agricultural Research, Bet Dagan, Israel)  
Poultry Science 51, No. 3, 868-876 (May 1972)

Earlier, unpublished work at the authors' laboratory indicated that the source of starch in a synthetic vitamin E-deficient diet may have a marked effect on the appearance of encephalomalacia in chicks. In the present study, they examined further some nutritional factors affecting the incidence of experimentally-induced encephalomalacia in chicks, with emphasis on (1) source of starch (potato or corn), (2) type of oil (safflower, soybean, cod liver, soybean soapstock), and (3) ingredient-derived (yellow corn and soybean soapstock)  $\alpha$ -tocopherol (AT). White Rock male chicks were used in the experiments. A basal semisynthetic, vitamin E deficient diet, with and without BHT supplementation, was used, and the test nutrients were incorporated into the diets.

When potato starch was used as an ingredient in the semisynthetic vitamin E deficient diet containing oxidized safflower oil, with or without BHT supplementation, it caused a higher incidence of encephalomalacia in chicks than did corn starch under the same experimental conditions. This difference may be caused indirectly. The chicks fed diets containing potato starch consumed more feed than those fed diets containing corn starch; as a result their intake of oxidized safflower oil increased correspondingly. This increase in intake of oxidized safflower oil by the chicks increased their corresponding requirement for AT, thus increasing the incidence of encephalomalacia. The two starches also seemed to show a differential effect on the stability of the fat in the diet; either corn

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0.5 ANTIGENIC RELATIONSHIPS AMONG STRAINS OF VIBRIO PARAHAEMOLYTICUS

Twedt, R. M., P. L. Spaulding, and H. M. Johnson (Division of Microbiology, Food and Drug Administration, Cincinnati, OH 45226)  
Applied Microbiology 23, No. 5, 966-971 (May 1972)

This paper reports on a tube agglutination study of the antigenic relationships of 79 strains of *V. parahaemolyticus* representing 46 assigned K-antigen types. The purpose of the study was to clarify antigenic relationships among *V. parahaemolyticus* isolated from marine and clinical sources. The 79 cultures were isolated from feces of patients suffering from gastroenteritis, from food implicated in food poisoning outbreaks, and from sea fish and sea water.

The homologous titers of 46 anti-K sera ranged from 80 to 2,560. The majority (36) ranged between 160 and 640; the mode was 320. All except three antisera exhibited from 1 to 6 heterologous reactions; most of them gave titers of  $\leq 20$ . However, 19 sera exhibited cross-reactions whose titers exceeded 40. Nine reciprocal and 16 unilateral relationships were noted among the antisera. Some of the cross-reactions involved heat-extractable K-antigens, whereas others did not involve K-antigens because absorption with the heterologous antigens had no effect on the homologous system. Apparently, many of the reciprocal and nonreciprocal heterologous reactions occurred between K-types that are not regarded as members of the same O-antigen group. The authors conclude that the data indicate that more study is needed before serotyping of *V. parahaemolyticus* according to their K-antigens can become a routine procedure.

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0.6  
(6.55) EFFECTS OF CHEMICAL ADDITIVE AND OF FORMALDEHYDE-GAS FUMIGATION ON SALMONELLA IN POULTRY FEEDS

Duncan, M. S., and A. W. Adams (Department of Dairy and Poultry Science, Kansas State University, Manhattan, KS 66502)  
Poultry Science 51, No. 3, 797-802 (May 1972)

Domestic animals are considered the largest single reservoir of *Salmonella* organisms. *Salmonella*-contaminated feed has been implicated as a major contributor in maintaining this reservoir. This article reports on the effectiveness of adding a commercial product (containing 53.8% active ingredients consisting of propionic acid, isopropyl alcohol, and phosphoric acid; and 46.2% inert ingredients) and of fumigating with formaldehyde gas on *Salmonella* in poultry feeds and feedstuffs. Chick starter, fish meal, and meat-and-bone meal were artificially contaminated with *S. seftenberg* 775W at a level of  $2 \times 10^6$  cells per gram of feed.

In the test with the commercial additive, the product was added to the contaminated feeds at levels of 0.1% and 0.2%. A standard quantitative test for *Salmonellae* was made on the test feed samples at periodic intervals during a 10-day storage period (to determine the effect of the additive on the *Salmonellae* in the feeds). Reduction in the levels of *Salmonella* in the test samples did occur, but they were not related to the presence of the additive. The reduction in levels of *Salmonella* resulted from spontaneous reduction rather than to any effect of the chemical additive. The degree of reduction of *Salmonella* differed among the types of feeds: chick starter showed the greatest reduction in the organism and meat-and-bone meal the least. The differences may be due to the differences in water activity ( $a_w$ ) of the feeds.

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0.6  
(0.7) LINEAR PROGRAMMING CONTROLS AMINO ACID BALANCE IN FOOD FORMULATION

Cavins, J. F., G. E. Inglett, and J. S. Wall (Northern Regional Research Laboratory, U.S. Department of Agriculture, ARS, 1815 N. University Street, Peoria, IL 61604)  
Food Technology 26, No. 6, 46, 48-49 (June 1972)

This article describes the use of linear programming techniques for the formulation of cereal-based foods in which the total essential amino-acid pattern (EAP) is controlled, and the use of a particular cereal ingredient and the cost are minimized. The cereal ingredients evaluated were corn, oats, and millet; the oil seed ingredients were defatted soy flour and cottonseed flour. Nonfat dry milk was considered in all the cereal mixtures because it is a source of good quality protein, is readily available, and helps improve the flavor of the products.

Parametric linear programming was used to formulate the optimum blends. The model contained equations for protein level, essential amino-acid pattern, ingredient level, and weight. The protein levels [(N)(6.25)] were set at 19% as the lower limit and 22% as the upper limit. The upper limit of oilseed meal plus nonfat dry milk solids was set at 35% so that the cereal level would be 65% or higher.

Several formulations were prepared and examined organoleptically and for protein efficiency ratio values (PER). A standard corn-soya-milk (CSM) mixture was examined for reference purposes. The composition and evaluation of the experimental samples are shown in the table that follows.

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO. 10 PAGE 3





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(7.0)  
STUDIES ON THE FUNCTIONAL PROPERTIES OF FOOD-GRADE  
SOYBEAN PRODUCTS. PART I. CLASSIFICATION OF SOYBEAN PRODUCTS  
BY THEIR CHEMICAL CONSTITUENTS AND PROTEIN PROPERTIES

Yasumatsu, Katsuharu, Jun Toda, Masahiro Kajikawa, Nagaoki Okamoto, Hiroshi Mori, Motoaki Kuwayama, and Kiyofumi Ishii (Food Research Laboratories, Food Products Division, Takeda Chemical Industries, Ltd., Osaka, Japan)  
Agricultural and Biological Chemistry 36, No. 4, 523-531 (Apr. 1972)

A food ingredient is incorporated into a formulation because of its functional properties which will give to the final product characteristics that are acceptable to the consumer. For example, in the preparation of ice cream a food ingredient capable of forming emulsions is added to provide for miscibility and impart a smooth texture to the finished product. Various soybean products are used in food manufacturing for their functional, economic, and nutritional characteristics. Other commodities are incorporated for similar purposes. The authors have performed a series of experiments designed to test the correlation of soybean products by function to a limited number of chemical constituents and protein properties. [The same rationale may be applied to food products added for a particular function such as protein enrichment. Abstractor's note]

Samples of 43 commercial soybean products and, to compare functional properties, three gluten products, and three casein products were analyzed for the following: crude ash, crude fat, crude fiber, crude protein, nitrogen-free extract, magnesium, calcium, potassium, and sodium.

Results indicate that the content of crude protein correlates negatively with all other characteristics, and positively with Na content. Sodium correlates negatively with nitrogen-free extract and all other metals present.

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 5

0.6  
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STUDIES ON THE FUNCTIONAL PROPERTIES OF FOOD-GRADE  
SOYBEAN PRODUCTS. PART II. FLAVOR PROFILE

Yasumatsu, Katsuharu, Jun Toda, Hisashi Aoki, Takeo Wada, and Kiyofumi Ishii (Food Research Laboratories, Food Products Division, Takeda Chemical Industries, Ltd., Osaka, Japan)  
Agricultural and Biological Chemistry 36, No. 4, 532-536 (Apr. 1972)

Undesirable flavor characteristics have been the major barrier to larger use of soybean products in foods. In part I of this series, correlation of functional properties of soybean products to chemical constituents and protein properties was investigated.

In this report the correlation of flavors to the properties of soybean products was investigated. The same soybean products and data on proteins and chemistry reported in part I were used.

Organoleptically, four undesirable "soybean" flavors and two acceptable "milk" and "miscellaneous" flavors were identified. The most purified product (soy protein isolate) and the least purified product (defatted soy flour) had the same major soybean flavor, indicating that degree of purification is not directly proportional to removal of inherent soybean flavor.

Soy protein extract is high in the desirable miscellaneous flavor score compared to other soybean products and is used in the industry as a milk substitute with added flavors such as vanilla. Defatted soybean flavor, undesirable for food use, is correlated with the amount of crude fiber. Extraction of soy protein from crude fiber is an effective process to reduce the soybean flavor in the resulting

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 5

0.7  
NUTRIENTS IN UNIVERSITY FOOD SERVICE MEALS.  
I. DATA DETERMINED BY FOOD INVENTORY

Guild, Louise, Dorothy Deethardt, and Elizabeth Rust (South Dakota Agricultural Experiment Station, Department of Home Economics, Brookings, SD 57006)  
Journal of the American Dietetic Association 61, No. 1, 34-37 (July 1972)

Data on selected nutrients (protein, fat, certain fatty acids, carbohydrates, certain minerals, and certain vitamins) in foods served at a university food service during five 1-month periods, are reported. The contributions of these nutrients by the food groups are also given. Except for iron, the nutrients were supplied in sufficient amounts so that, allowing for cooking waste, cooking losses, and food not eaten, the students should have been able, by making appropriate choices, to meet the Recommended Dietary Allowances. The sources of fatty acids and cholesterol in the foods served are shown in the table that follows.

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 5

0.7  
NUTRIENTS IN UNIVERSITY FOOD SERVICE MEALS.  
II. DATA FROM MEALS SELECTED BY STUDENTS

Guild, Louise, Dorothy Deethardt, and Elizabeth Rust (South Dakota Agricultural Experiment Station, Department of Home Economics, Brookings, SD 57006)  
Journal of the American Dietetic Association 61, No. 1, 38-41 (July 1972)

Part I, on pages 34-37 of this same issue, reported data on the selected nutrients of foods used in preparing meals in a university food service, as determined by calculations based on the inventory records of foods issued. This part II reports on the nutrients contributed by 604 meals selected by a sample group of students at the same university food service. During the spring and fall periods of the 5-month inventory study (see part I of this series), the foods selected by the sample population in the cafeteria line at each of three meals, the number of servings, and the size of servings (when self-service was permitted) were recorded. The choices of foods were limited, but each student could have additional milk. The study did not include snacks. Calculations were made of the protein, fat, carbohydrate, certain minerals, certain vitamins, and certain fatty acids contents of the meals selected by the students.

Except for acceptance or rejection of the dishes offered, the greatest variation in the meals was in the amount of milk consumed. Except for the iron intake of women students (which averaged only about 10 mg.), the average intakes of nutrients for daily meals met or exceeded the Recommended Dietary Allowances for young adults. The meal-to-meal variation for most of the nutrients in most meals was greater than the day-to-day variation. The students obtained 16% of the calories from protein and the rest from the fat and carbohydrate, almost equally divided.

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 5

0.7 PLANNING MEALS FOR THE BACKPACKER WITH DIABETES --  
(0.4) NUTRITIONAL VALUES OF FREEZE-DRIED FOODS

Labrenz, Janice Bate (The Mason Clinic, Seattle, WA 98101)  
Journal of the American Dietetic Association 61, No. 1, 42-48 (July 1972)

This report contains information on backpacking-style meals for persons with diabetes. One table lists the carbohydrate, protein, fat, and calories (proximate composition) of 108 commercial freeze-dried food products. Two sample menus for 1 day's meals (breakfast, morning snack, noon meal, afternoon snack, evening meal, bedtime snack) are given.  
[2 illustrations, 2 tables, 1 reference]

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[see references 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

Food	Cholesterol	Protein	Total fat	Total carbohydrate	Total fiber	Total ash	Total water	Total energy
505	61	65	19	19	19	19	19	19
506	61	65	19	19	19	19	19	19
507	61	65	19	19	19	19	19	19
508	61	65	19	19	19	19	19	19
509	61	65	19	19	19	19	19	19
510	61	65	19	19	19	19	19	19
511	61	65	19	19	19	19	19	19
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513	61	65	19	19	19	19	19	19
514	61	65	19	19	19	19	19	19
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566	61	65	19	19	19	19	19	19
567	61	65	19	19	19	19	19	19
568	61	65	19	19	19	19	19	19
569	61	65	19	19	19	19	19	19
570	61	65	19	19	19	19	19	19
571	61	65	19	19	19	19	19	19
572	61	65	19	19	19	19	19	19
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598	61	65	19	19	19	19	19	19
599	61	65	19	19	19	19	19	19
600	61	65	19	19	19	19	19	19

0.6 BALANCED NUTRITION THROUGH FOOD PROCESSOR PRACTICE  
(0.7) OF NUTRIFICATION. MODEL EXPERIENCE IN SCHOOL FOOD SERVICE

Lachance, Paul A., Ruth Brown Moskowitz, and Henry H. Winawer (Department of Food Science, Rutgers University, New Brunswick, NJ 80903)  
Food Technology 26, No. 6, 30, 32-34, 36, 40 (June 1972)

This article reports on the authors' experience, using a school food service as a model, in the improvement of the nutritional aspects of an institutional feeding system. The work, a cooperative project between Rutgers University and 80 food processors, demonstrated that the nutritional effectiveness of school feeding programs could be improved. This enhancement was accomplished by (1) testing the acceptance of the foods to the school children, (2) the adding of selected micronutrients based on the Recommended Dietary Allowances (in



[Authors and titles listed below]

Federation Proceedings 31, No. 3, 1151-1193 (May-June 1972)

The introduction and five articles of this symposium are from the American Institute of Nutrition Symposium presented at the 55th Annual Meeting of the Federation of American Societies for Experimental Biology, Chicago, Ill., April 14, 1971. The articles deal primarily with the utilization of nonprotein nitrogen in ruminants, lower nonruminant species, and man. Each author summarizes the status of present knowledge and indicates areas in which additional research is needed.

The introduction and articles are as follows:

"Introductory Remarks," by Willard J. Visek (Department of Animal Science, Cornell University, Ithaca, NY 14850), *ibid.*, p. 1151. [1 reference]

"Metabolic Aspects of Nonprotein Nitrogen Utilization in Ruminant Animals," by William Chalupa (Faculty of Nutrition and Department of Dairy Science, Clemson University, Clemson, SC 29631), *ibid.*, pp. 1152-1164. [5 figures, 1 table, 180 references]

"Nonamino and Amino Nitrogen in Nonruminant Nutrition," by D. Lewis (Department of Applied Biochemistry and Nutrition, University of Nottingham, England), *ibid.*, pp. 1165-1171. [5 figures, 4 tables, 31 references]

"Nonspecific Nitrogen in the Nutrition of Human Beings," by Constance Kies (Department of Food and Nutrition, University of Nebraska, Lincoln, NE 68503), *ibid.*, pp. 1172-1177.

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Culley, Michael, and Paul Driver (Portsmouth Polytechnic, The Marine Laboratory, Ferry Road, Hayling Island, P.O. 11 ODG, England)  
Fishing News International 11, No. 4, 32-36 (Apr. 1972)

Of the shellfish landed in Ireland, crawfish (*Palenarus vulgaris* or *P. elaphas*) form a substantial part of the total. The fishery for crawfish is well established; substantial investments have been made in it recently and before the war. The coasts of Ireland are divided into four fisheries areas. Off the west and south coasts lie the most important crawfish areas with a minor area off the north coast.

The areas where the crawfish are taken reflect the occurrence of the warmer waters of the North Atlantic Drift. The crawfish is a warm water species inhabiting crevices and steeply sloping faces of rock reefs down to 200 ft. along the rocky coasts. The currents in these areas are often fast flowing which makes capturing them difficult and hazardous. The main fishing season is May to September, and it sometimes begins a month earlier and ends a month later. Peak activity depends on the weather; the greater landings occur in good weather.

Crawfish are taken in pots of the French barrel design. The fish boats range from small open boats with outboard engines to boats of 70 ft., which are also trawlers. The smaller boats can tend about 40 pots, and the larger about 200 pots. In other places on the grounds, trawls are used. Among the factors influencing catches, one of the most important may be the migration of crawfish to and from deep water.

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Peterson, Clifford L. (editor) (Inter-American Tropical Tuna Commission, c/o Scripps Institution of Oceanography, La Jolla, Calif.)  
Published by the Inter-American Tropical Tuna Commission, c/o Scripps Institution of Oceanography, La Jolla, Calif., 129 pp. (1971). Price \$2.00.

The Inter-American Tropical Tuna Commission operates under a convention originally entered into by the Republic of Costa Rica and the United States in 1950. Later, Panama, Ecuador, Mexico, Canada, and Japan adhered to the convention. Ecuador withdrew from adherence to the convention in 1968.

The duties of the Commission are to study the tunas and related species of the eastern Pacific to determine the effects of fishing and natural factors on their abundance, and to recommend appropriate conservation measures to maintain the stocks. On the basis of information generated by the studies the Commission recommended in 1962 that the yellowfin tuna fishery in the eastern Pacific Ocean be placed under international management to ensure maximum harvests on a sustained basis. The fishery under management is called the Commission's Yellowfin Regulatory Area (CYRA). In 1969, the Commission implemented a 3-year experimental fishing program to ascertain empirically the maximum sustainable yield of yellowfin tuna from CYRA. The experiment called for an annual catch of 120,000 short tons to be taken in 1969, 1970, and 1971. For 1971, the quota was increased to 140,000 short tons. The fleets of all nations in 1971, caught about 114,200 short tons of yellowfin tuna and about 115,230 short tons of skipjack tuna in the CYRA. The yellowfin tuna catch was substantially below the recommended quota for 1971. The

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Reid, Gerald M. (Auke Bay Fisheries Laboratory, National Marine Fisheries Service, NOAA, Auke Bay, AK 99821)  
NMFS Extension Publication, Fishery Facts-2, 20 pp. (June 1972) (NOAA, National Marine Fisheries Service, U.S. Department of Commerce, Seattle, Wash.) Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price \$0.25.

The Pacific herring, *Clupea harengus pallasii*, is a valuable natural resource in the coastal waters of Alaska, not only because of its direct commercial significance but also because of its importance as a component in the complex food cycle of other commercially valuable fishes.

Pacific herring are indigenous to the North Pacific rim and are closely related to the herring of the Atlantic Ocean.

Pacific herring generally spawn on intertidal vegetation in the spring. Although spawning is often successful in terms of density, subsequent mortality of eggs and larvae may exceed 99%.

Herring abundance fluctuates greatly. Biologists have attempted to understand and predict fluctuations by studying changes in the numerical strength of different year classes of herring taken by the commercial fisheries.

Commercial utilization of Alaska herring by American fishermen is at a low level because of various socioeconomic problems, although thousands of tons were taken in the past for food and industrial products. Foreign vessels are currently taking large quantities of herring in areas offshore from Alaska. A viable herring

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1.3 TIMING, ESCAPEMENT, DISTRIBUTION, AND CATCH  
OF KODIAK ISLAND SALMON, 1970

Bevan, Donald E. (Fisheries Research Institute, College of Fisheries, University of Washington), Jack Lechner, and Martin F. Eaton (Alaska Department of Fish and Game)  
Fisheries Research Institute Circular 72-8, 71 pp. (June 26, 1972) (College of Fisheries, University of Washington, Seattle, WA 98195)

Since 1952, yearly estimates of the timing, magnitude, and distribution of the salmon escapement in the streams of the Kodiak area have been obtained. Pink salmon is the most important species in the area.

A comparison of escapement counts in 1970 with the even year averages of 1952 to 1968, and of the catch data in 1970 with even year averages from 1954 to 1968 indicates that the timing of the run was slightly earlier than normal.

The total catch of sockeye salmon, 916,115 fish, was the highest since 1950. The total catch of chum salmon was about 920,075 fish. For pink salmon the total catch was 12,036,598 fish, about 5,750,000 above the past 23-year average. The major portion of the catch was taken from the eastside and Uyak-Uganik districts. All districts produced good pink salmon catches except Olga-Moser Bays. The case pack of pinks was estimated to be 492,000 cases, about 196,000 above the 20-year average.

Although the total catch for the Kodiak area (13,941,230 fish) was one of the highest, increased units of gear participating in the fishery resulted in below average catches for numerous fishermen. Escapements were less than desired. Intense fishing effort and violations of waters closed to commercial fishing was

(over)

1.3 THE STOCK CONCEPT IN PACIFIC SALMON  
(9.12)

Simon, Raymond C. (Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR 97331), and Peter A. Larkin (Institute of Animal Resource Ecology, University of British Columbia, Vancouver 8, British Columbia, Canada) (editors)

A series of papers presented at a Stock Identification Workshop at the Biological Laboratory, U.S. Bureau of Commercial Fisheries, Seattle, Wash., April 8, 1970. H. R. MacMillan Lectures in Fisheries, University of British Columbia, Vancouver 8, British Columbia, Canada (1972), 231 pp.

For several years many of the problems of management of Pacific salmon have posed underlying questions about the concept of stocks, the techniques for their identification, and the relative contributions of hereditary and environmental factors in the population biology of salmon. A stock identification workshop was held, April 8, 1970, where a series of papers was presented on the subject, at the Biological Laboratory, Bureau of Commercial Fisheries, now known as the National Marine Fisheries Service. The papers and authors are listed under the following subjects.

- I. The Problem  
"The Stock Concept and Management of Pacific Salmon" by P. A. Larkin;
- II. The Present Knowledge  
"Hereditary and Environmental Factors Affecting Certain Salmonid Populations" by M. E. Ricker (Fisheries Research Board of Canada, Biological Station, Nanaimo, B.C., Canada);  
"Gene Frequency and the Stock Problem" by Raymond C. Simon;

(over)

2.06 MINCED FISH FLESH HAS MANY USES

Davis, P. (Fisheries Division, Department of Primary Industry, Canberra, A.C.T. 2600, Australia)  
Australian Fisheries 31, No. 5, 12 (May 1972)

Fish sausage and a fish paste called kamaboko are Japanese foods made from fish fillets chopped up with other ingredients. Minced fish flesh is now available, and it is proving to be a satisfactory substitute for chopped up fillets in the preparation of kamaboko. A joint venture between Japanese and New Zealand companies has been established in New Zealand for the production of minced fish flesh for export to Japan.

Increased consumer acceptance of minced fish flesh makes possible more economic use of the fish carcass through application of deboning machines. [For example, after hand filleting, the fish remains can be processed through a deboning machine, and the yield of flesh can then be minced. Abstractor's note] Minced fish flesh may also be derived from edible fish not presently utilized. Yields of shrimp, crab, and lobster meat can also be increased by processing through the deboning machine. The properties of minced fish flesh vary according to particle size and species of fish, and may be altered by use of additives. Processing must take place under carefully controlled conditions to avoid damaging the flesh protein. Quality control and inspection techniques have been devised to maintain standards that have gained consumer acceptance. Species of fish inhabiting Australian waters are being investigated for applicability to minced fish flesh production.

SW

2.116 SUPPRESSING MARINE RADIO INTERFERENCE  
(2.114)(2.146)

Anonymous  
Australian Fisheries 31, No. 5, 13-17 (May 1972)

There are many electronic devices on boats such as radiotelephones, direction finders, radar, sonar, and echo sounders. This equipment can generate unwanted radiofrequency energy by varying or interrupting the flow of current to them. In the normal operation of equipment, switches, thermostats, rheostats, ignition systems, and generator fields vary or interrupt the flow of current. Sometimes rotation of a propeller shaft generates interference. Interference is introduced into receivers by either conduction or radiation. Conducted interference flows through power lines or other wires to the receiver. Radiated interference is transmitted through space and is picked up by the receiver antenna system of the equipment.

Reduction of interference to a tolerable level can be achieved by three methods: by shielding or screening, by filtering out the noise signal, and by electrically bonding the equipment and shielding. Shielding uses a metal sheet or screen barrier around sensitive wires or components to reduce penetration by radiated energy. The shielding must be electrically bonded to a common ground so that unwanted radiofrequency energy can be conducted away. Filtering out interference is achieved by means of a capacitor and/or an inductor which confine the interference to a small nonradiating circuit. Interference from ignition systems can be suppressed by means of resistors and capacitors. (A diagram in the article shows how to suppress interference from this source.)

(over)

### III. Techniques for Future Studies.

"Discrimination of Breeding Groups of the Muricid Snail *Thais lamellosa* Using Radioisotope X-Ray Spectrometry and Multivariate Discriminant Analysis" by John S. Stimson (Department of Zoology, University of Hawaii, Honolulu, Hawaii);

"Field Evaluation of Coded Wire Tag Detection and Recovery Techniques" by Earle D. Jewel and Robert C. Hager (State of Washington Department of Fisheries, Management and Research Division, Olympia, Wash.);

"Phospholugumutase and Esterase Polymorphism in Pacific Herring in Washington Waters" by Fred M. Utter (National Marine Fisheries Service, North Pacific Fisheries Research Center, Seattle, Wash.);

"Serological and Biochemical Studies in Racial Identification of Fishes" by Harold O. Hodgins (National Marine Fisheries Service, North Pacific Fisheries Research Center, Seattle, Wash.);

"Identification of Stocks of Pacific Salmon by Means of Scale Features" by Richard L. Major, Kenneth H. Mosher, and James E. Mason (National Marine Fisheries Service, North Pacific Fisheries Research Center, Seattle, Wash.).

..... SW

Chemical Abstracts 76, No. 17, 95492t (Apr. 24, 1972)

## 2.9 MULTIPLE TOXINS IN CIGUATERA FISH SPECIES

### 1.3

a significant factor decreasing escapement rates into the major producing pink salmon systems. Emergency orders completely curtailed weekly fishing periods in certain portions of the area to allow escapement rates to increase.

[29 figures, 7 tables, 3 references]

Smoking fluid is produced by exposing finely divided wood to superheated steam. An oxygen-enriched atmosphere may be introduced with the superheated steam.

Food Technology 26, No. 6, 80 (June 1972)

Fessman, G. (pat.)

### 3.4 SMOKING FLUID

gasses to promote further interaction of the components.

This is two-step process in which either of the two steps takes place in an oxygen-enriched atmosphere. In the first step, superheated steam is passed

Food Technology 26, No. 6, 80 (June 1972)

### 3.4 SMOKED CURING AGENTS

Fessman, G. (pat.)

[2 figures, 3 tables, 3 references]

DLI

1

Electrical bonds are fixed connections between metal surfaces that result in low impedance connections. A bond ensures that radio currents cannot flow more easily in one part of a structure than in another. Corrosion of electrical bonds may render them ineffective. Precautions should be taken to prevent corrosion, and inspections must be made to locate faulty bonds so that corrective action may be taken. Sources of interference may be determined by switching on and off various pieces of equipment while listening to or watching receivers. The next step would be to decide the procedure to be followed in suppressing the interference.

[ ]

FTP

[10 figures, 8 references]

This bulletin describes the design, construction, and use of pots for catch-

Washington, DC 20402. Price \$0.25.

Seattle, WA 98102)  
NMFS Extension Publication, Fishery Facts-3, 13 pp. (June 1972) (NOAA, National

2.118 DUNGNESS CRAB POTS

## 2.3

# THE APPLICATION OF CONTINUOUS CENTRIFUGATION TO SEAFOOD PROCESSING

Learson, R. J. (National Marine Fisheries Service, NOAA, Atlantic Fishery Products Technology Center, Emerson Ave., Gloucester, MA 01930), G. Reierstad (Bird Machine Co., South Walpole, MA 02071), and V. G. Ampola  
Food Technology 26, No. 7, 32-34 (July 1972)

Experiments were carried out with a continuous decanting centrifuge using brine (15% salt solution) and designed primarily to separate crab meat from shell material. The equipment was applied to claw, leg, and body sections of six species of crab and to various fish and shellfish waste materials.

The shellfish or fish material is chopped or ground to a particle size of less than 3 cm. The mixture is fed into the centrifuge; the brine circulates continuously within the centrifuge system. The centrifuge is rotated at a selected rate within the range of from 200 to 800 r.p.m. During the rotation of the centrifuge bowl, a pool of brine 1-3 cm. deep is held on the outside of the bowl by the centrifugal force. The shell material drops to the outside of the bowl and is removed by a screw conveyor. The shellfish or fish meat floats on the brine and is screened out at the exit port. The variables influencing the separation of meat and shell (or meat and bones) are the specific gravity of the brine, the rate of flow of the brine, the depth of the brine pool held on the outside of the rotating centrifuge bowl, and the speed (r.p.m.) of the centrifuge. The separation method appears applicable to recovery of meat from clam, leg, and body sections of various crabs, from the shucking waste (shell and meat) of the surf clam, from the cooked bodies and legs of lobster, and from the fillet frames of cod, haddock, and atlantic ocean perch.

DLI



Wolff, I. A., and A. E. Wasserman (Eastern Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, PA 19118)

Science 177, No. 4043, 15-19 (July 7, 1972)

A comparison was made of the potential hazards of nitrite, nitrate, and nitrosamines in the environment. Most of the nitrates in the diet are from vegetables, domestic water supplies, and cured meats. The safe level of nitrates in potable water has been defined to be a maximum of 10 p.p.m. In the United States, nitrates are permitted as additives to meat at the level of 2-3/4 to 3-1/2 oz. per 100 lb. of meat. The nitrates ingested from these sources are rapidly excreted in urine. Under conditions in which they may be reduced to nitrites, nitrites are a potential hazard. Conditions in the digestive tracts of animals or humans may favor the growth of bacteria which can reduce nitrates to nitrites with subsequent toxicity to the host. Spinach or other vegetables stored under conditions favoring growth of microorganisms, or damp forage, may cause reduction of nitrates to nitrites with subsequent toxicity to the host--human or animal. Toxicity of nitrites is due to oxidation of iron in hemoglobin to form methemoglobin which is incapable of transporting oxygen to the tissues. Asphyxiation occurs when the concentration of methemoglobin exceeds 70%. The incidence of nitrite poisoning is quite low.

The source of most of the nitrites in the diet are cured meat and fish. The action of nitrites in the curing process provides an attractive red color, produces the cured flavor, and inhibits bacterial growth.

(over)

Adams, H. W., and W. Owen (FMC Corporation, Canning Machinery Division, Research Department, San Jose, CA 95108)  
Food Technology 26, No. 7, 28-30 (July 1972)

Lighter weight cans are now being used for canning food products. Information on the internal pressures developed in such cans during processing are needed in order to design equipment and cans that would withstand various retort temperatures in continuous agitating equipment. Cans then can be designed for any particular product. In this study, the authors measured the internal temperatures and pressures developed during the continuous agitation processing of cans containing water, dog food, tomato juice, and a milk product. The items were processed in a pilot sterilizer called a steritort.

A unit consisting of a potentiometric pressure transducer (0-100 p.s.i.a.) enclosed in a plastic housing which contained a telemetry transmitter and battery was used. This unit was connected to the can containing the food product, and the can, with the attached unit, was processed in the steritort. The transducer measured the pressure and the thermistor was used to measure temperature. The telemetry system included a temperature-sensing probe (thermistor), a miniature radio, transmitter, receiver, digital temperature display, and a recorder. The temperature and pressure information was transmitted from the can to a receiving antenna and then to a receiver. No thermocouple wires were employed.

Pressure and temperature curves for the various canned products processed in the steritort are given. The pressure developed in a can of the given process

Ackman, R. G., S. N. Hooper, S. Epstein, and M. Kelleher (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)  
Journal of the American Oil Chemists' Society 49, No. 6, 378-382 (June 1972)

Exploratory fishing operations off Nova Scotia, Canada, brought up substantial quantities of the white barracudina (*Paralepis rissoi* Kröyeri Bonaparte 1840). The lipid of these fish contained a relatively high proportion of wax esters. Because the extent of this resource appears to be large, it was considered that the commercially processed oil from these fish might be suitable as a substitute for the oil from the sperm whale (*Physeter catodon*). This report gives data on the lipids of the barracudina as a basis for commercial evaluation of and to stimulate interest in this resource.

The body (dressed fish) contained 17.7% lipid, 10% of which consisted of triglyceride and 85% of wax ester. The triglycerides had a calculated iodine value of 48 and were unusually rich in the following fatty acids: 14:0 (25.8%), 18:0 (4.3%), 20:0 (1.19%), 22:0 (0.45%), and 24:0 (0.75%). The wax ester fatty acids had a calculated iodine value of 126 and showed a fatty acid composition "normal" to marine oils. The wax ester fatty alcohols showed 42.2% hexadecanol, 29.5% octadecanol, 8.2% eicosanol, and 3.8% docosenol.

Oil from sperm whales is not permitted entry into the United States, because this mammal is considered an endangered species. The use of barracudina lipid as a substitute for sperm whale oil may be possible in some applications--the authors compare the composition of the oils relative to their commercial uses. The table (over)

Bartov, I., and S. Bornstein (Division of Poultry Science, The Volcani Institute of Agricultural Research, Bet Dagan, Israel)  
Poultry Science 51, No. 3, 859-868 (May 1972)

Ethoxyquin (1,2-di-hydro-6-ethoxy-2,2,4-trimethylquinoline) and BHT (butylated hydroxytoluene) are used in feeds and feedstuffs to prevent oxidation of vitamin A, carotene, and fat. Ethoxyquin (EQ) is generally used in the local poultry rations. This study, consisting of three trials, compared the effects of EQ and BHT under different conditions of formulation and storage of feeds. Trial 1 compared the effects of EQ and BHT when added to practical-type diets containing either fresh or oxidized safflower oil, with or without supplementary  $\alpha$ -tocopheryl acetate (ATA). Trial 2 compared the relative efficiency of EQ and BHT in protecting chicks against encephalomalacia. Trial 3 compared the efficiency of EQ and BHT in protecting some lipid components of diets that were stored for a relatively long period under severe conditions, and included observations on the effects on the performance of chicks fed these treated and stored diets. White Rock male chicks were used.

EQ and BHT, when added at a level of 125 mg./kg. of feed, protected with equal effectiveness the lipids in practical-type and semipurified diets held for 27 weeks at temperatures that ranged from 18° C. to 26° C. EQ and BHT, when added to the diets, acted similarly in improving the body weights of the chicks, the feed/gain ratio, and vitamin A level in the liver; this was true only when the test conditions were such as to lead to the deterioration of the unprotected

Blitek, Donata, and Jozef Jeske (Inst. Lekow, Warsaw, Poland)  
 Chemical Abstracts 76, No. 19, 110508y (May 8, 1972)

[2 figures, 2 tables, 33 references]

Wax ester	Fatty acids composition of:			Fatty alcohols composition of:		
	Barracudina body oil	Sperm whale body oil	Sperm whale head oil	Barracudina body oil	Sperm whale body oil	Sperm whale head oil
14:0	6.2	3.3	14.4	3.8	3.2	11.0
14:1	0.3	2.4	33.3	--	--	--
16:0	6.3	8.1	2.8	40.2	24.9	49.7
16:1	15.7	26.9	9.5	0.5	9.6	4.4
18:0	0.4	1.1	0.2	7.0	4.3	3.5
18:1	34.2	33.3	4.9	29.6	44.9	27.3
20:1	4.3	10.9	0.9	8.3	5.0	0.5
20:5 $\omega$ 3	8.5	1.7	--	--	0.3	Trace
22:1	5.3	2.2	--	5.5	0.2	--
22:5 $\omega$ 3	0.4	0.8	0.2	--	0.6	Trace
22:6 $\omega$ 3	8.9	2.1	0.3	--	--	--

4.13 (4.80) that follows shows the amounts of important components of wax esters of barracudina body oil and sperm whale body and head oils.

4.5  
(0.5)  
INFLUENCE OF HERRING MICRO-ORGANISMS ON FAT OXIDATION.  
II. RESPIRATION OF LINOLEIC ACID HYPEROXIDES

Senser, F., and W. Grosch  
2. Lebensmitteluntersu.-Forsch. 147, No. 4, 200-206 (1971) (In German, English summary)

BEMIRA Abstracts 25, No. 5, Abstract No. 1653, 336 (May 1972)

[2 figures, 5 tables, 27 references] FTP

diets. Both antioxidants, when added to the diets, increased the accumulation of xanthophylls in the livers of the chicks. The diet containing EQ improved significantly the stability of the lipids of the liver (as measured by TBA values) as compared to the unsupplemented control diet; no significant difference was found between the diet containing EQ and that containing BHT. The stability of the lipids of the livers of the chicks was significantly improved by dietary ATA and adversely affected by the oxidized oil in the diet.

EQ, fed at levels of 80 and 120 mg./kg. in the diet, almost completely prevented encephalomalacia in chicks fed a semipurified diet low in vitamin E and containing oxidized safflower oil; BHT under the same conditions did not.

The authors concluded that neither of the antioxidants, when used in practical

4.6 (0.7)

Additional information defines the problems more clearly.

[60 references]

SW

amines which have also been found in tobacco smoke. Commonly used drugs taken either in large doses or for long periods contain secondary amines or amine precursors. Reacting nitrite with oxytetracycline and nantipyrine yielded N-nitrosodimethylamine. Extended studies are needed before conclusions can be drawn. The extent of real danger is not yet known, but the available information suggests that there is no cause for alarm. Nitrites and nitrosamines should continue to be regarded as possible important toxicants, but interaction relative to modification of the food supply should be taken cautiously until additional information defines the problems more clearly.

In addition to being potentially toxic, nitrites are considered a potential reactant precursor for nitrosamines. Certain marine fish contain large quantities of trimethylamine, trimethylamine oxide, and dimethylamine which may react with nitrites to form N-nitrosodimethylamine.

Studies (reported elsewhere) in animals indicated that N-nitrosamines and the related N-nitrosamides are carcinogenic, and they may be mutagenic and teratogenic. The results of studies suggest that these compounds would be carcinogenic in man. Although nitrosamine formation occurs readily *in vitro*, in the normal, healthy human, gastric conditions do not seem to favor nitrosamine formation. Other environmental factors are potential sources of nitrosamines. Tobacco plants are rich in

### 3.4 (SALMON) PROCESSING EFFECTS ON THE TEXTURE OF GOLDFEYER (HIODON ALOSOIDES)

Lantz, A. W. et al.  
Can. Inst. Fd Sci., Technol. J. 5, No. 1, 39-43 (1972)  
BFMIRA Abstracts 25, No. 5, Abstract No. 1740, 354 (May 1972)

Sensory evaluation by ten judges showed hot-smoked (65°C) goldeneye salmon to be soft and mealy as compared with cold-smoked (32°C) fish which was firmer and more flaky. Freezing prior to smoking was found to enhance moistness, firmness, flakiness and acceptability, but not to overcome the textural disadvantages in the case of hot smoking. Acidification of the brine prior to smoking increased moistness and softness but had no effect on acceptability. S.M.S. Reprinted

[7 figures, 3 references]

temperature is influenced by can closing temperature, can closing pressure, volume of fill, dimensions of the can, the noncondensable gases in the product, the noncondensable gases generated during the process, and the configuration of the ends of the cans. Theoretical calculations for a particular product are difficult; therefore, direct pressure measurements are desirable.

3.337 (0.8)



Okazaki, Akio (editor)

Published by the Tokai University Press, Tokai Building, Shinjuku-ku, Tokyo, Japan  
(1971), 165 pp. Price \$10.00. (In English)

About 30,000 to 40,000 tons of seaweed are produced annually from sources along the coasts of Japan. This yield of seaweed is then supplied to the markets for food and for raw material for industry. This work is a survey of seaweed as it is used in Japan. It covers taxonomy, detailed uses of each species, propagation and culture, harvesting, history, names of companies in the business, statistics of production, chemical analyses, manufacturing processes, and geographical location of beds along the coasts for each species.

The survey is subdivided into the following subjects.

Seaweeds and their distribution in Japan, seaweed production in Japan, survey of culture and use, value of seaweeds as shellfish feed, and as a shelter for fish eggs and spawn.

Species of Laminaria and their distribution, harvesting, kinds of processes used in preparation, uses, economic importance, and export. These seaweeds are used as food and as seasonings.

Species and distribution of Undaria, harvesting and production, propagation, and culture. These seaweeds are a popular food in Japan; accordingly, they are grown naturally and also cultured on rafts.

(over)

Hyder, Kamaluddin, and Bryant F. Cobb, III (Department of Animal Science, Texas A&M University)

Sea Grant Publication No. TAMU-SG-72-201, viii + 93 pp. (Mar. 1972) (Texas A&M University, Sea Grant Program, College Station, TX 77840)

A process for preparing fish protein concentrate (FPC) with rehydration and emulsifying properties is described. Micropogon undulatus, which is discarded during shrimp operations in the Gulf of Mexico, is used as a starting material. Theoretical aspects of maintaining functional properties in hot solvent extracted proteins are discussed. The rehydration and emulsifying capacities of fish protein are maintained by pH adjustment to prevent protein-protein interaction during hot solvent extraction processes.

The process for preparing FPC from 100 g of fish muscle consists of the following steps: (1) comminution with 5 g of NaCl, (2) adjustment of pH to 2.5 with 1N HCl, (3) extraction of lipids with 400 ml of 1:1 mixture of 95 percent ethanol and hexane by refluxing at 70° C for 30 minutes, (4) removal of solvents by filtration or centrifugation, (5) repetition of the steps 3 and 4 until most of the lipids are removed, and (6) drying of FPC below 70°C in air or vacuum.

The FPC produced by this method has the following qualities: (1) amino acid spectrum similar to that of the fish muscle, (2) bacteriologically sterile, (3) water retention capacity at least twice the capacity of the original fish muscle, (4) forms emulsions in oil-water mixtures, (5) has high protein efficiency ratio, (over)

De Halperin, Delia R. (CIBIMA, Libertad 1235, Buenos Aires, Argentina)

Boletín de la Sociedad Argentina de Botánica 13, No. 1, 42-44 (Mar. 1970)

Contribución Técnica No. 7 (n.d.), Centro de Investigación de Biología Marítima, Libertad 1235, Buenos Aires, Argentina) (In Spanish; English summary)

Blue-green algae were kept alive for 6 years in test tubes on sterile vermiculite soaked in nutritive medium and held under suitable light conditions. The algae species consisted of Microcoleus vaginatus (Vaucher) Gomont (Oscillatoriaceae), Anabena variabilis (Kützinger) Bornet et Flahault and Nostoc muscorum Agardh (Nostocaceae). Microchaete diplosiphon Gomont and Scytonema hofmannii Agardh (Scytonemataceae), and Calothrix parietina (Nageli) Thuret (Rivulariaceae). [8 references]

Chlorella and yeast extracts are used to suppress the acidlike taste of  
FIP

Food Technology 26, No. 5, 116 (May 1972)

6.37 CANNED PINEAPPLE

Charm, S. E., R. J. Learson, L. J. Ronsivalli, and M. Schwartz (National Marine Fisheries Service, NOAA, Atlantic Fishery Products Technology Center, Emerson Ave., Gloucester, MA 01930)

Food Technology 26, No. 7, 65-68 (July 1972)

A trained panel by experience learned to express the storage quality of cod fillets in terms of the estimated number of days in 1° C. refrigerated storage. Odor was used as the primary indicator of quality. Then, the panel determined the rate of spoilage of cod fillets (quality was expressed in terms of estimated number of days in 1° C. refrigerated storage) stored at various constant temperatures (1°, 4°, 6°, and 8° C.). The cod spoiled at a constant rate when stored at constant refrigerated temperatures. From these results, the authors developed a simple graphical method for estimating the shelf life of cod fillets for any given storage condition or set of storage conditions. The figure that follows shows the graphical method for predicting the quality of cod fillets stored under a given set of storage conditions.

(over)

# EFFECTS OF POLYPHOSPHATES ON EXTRACTABILITY OF AGAR IN THE COOKING PROCESS OF SEaweEDS. I. RELATIONSHIP BETWEEN VARIETY OF POLYPHOSPHATES AND EXTRACTABILITY OF AGAR

Matsubashi, T.  
Bull. Jap. Soc. scient. Fish. 37, No. 5, 441-448 (1971)  
BFMIRA Abstracts 25, No. 2, Abstract No. 537, 112 (Feb. 1972)

Ten different kinds of phosphates were used in experiments with *Gelidium pacificum* Okamura and *Gracilaria verrucosa* (Hudson) Papenfuss. The processing of the seaweeds and the analysis and measurements of agar and agar gel are described in detail. In general it was found that the effect of polyphosphate on agar extraction becomes greater with increasing degree of condensation of phosphate. L.P.

## II. EFFECTS OF CONCENTRATION OF POLYPHOSPHATES AND COOKING PERIOD ON EXTRACTABILITY OF AGAR AND GEL PROPERTIES *ibid.* 449-454.

In this second part the effects of different concentrations of sodium hexametaphosphate and sodium triphosphate on agar extraction were studied and the results given graphically. Gel properties and yield were also determined and the results showed that sulphuric acid could be replaced advantageously by polyphosphates in the agar extraction process. L.P.  
Reprinted

History of purple Porphyra industry, method of culture, processing, production, uses, and commercial value. Purple Porphyra is rich in food values and high in commercial value. The areas on the coast, where it provides a livelihood for gatherers, are deteriorating due to industrial pollution.

The alginate industry uses the genera *Eisenia*, *Ecklonia*, and *Laminaria* unfit for human food. Other subjects covered are manufacture of alginate, and propylene glycol ester of alginic acid, industrial uses, and inspection methods.

The red seaweed *Gelidium* is used in the production of carrageenan, textile sizing, drugs, binding material, cosmetics, and pigments.

Seaweeds used for production of agar-agar, new methods of manufacture, uses, economics, and inspection methods. Many genera of seaweeds are used to make agar-agar, and are used in foods, candy, food preservation, medicine, dentistry, and microbiology.

Seaweeds in cattle and poultry feed and as a fertilizer. Genera used are *Ecklonia*, *Eisenia*, and *Sargassum*.

This is a comprehensive review which contains a small section on the absorption, fate and toxicological studies of orally administered carrageenan. There is a reference list of some 100 items. L.P.

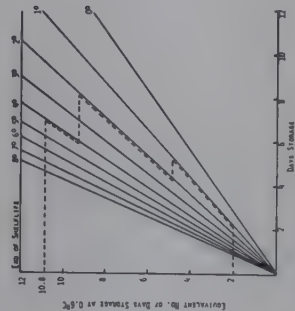
Reprinted

## BIOLOGICAL PROPERTIES OF CARRAGEENAN

Dl Rosa, M.

J. Pharm. Pharmac. 24, No. 2, 89-102 (1972)

BFMIRA Abstracts 25, No. 6, Abstract No. 2062, 417 (June 1972)



Note: (1) Initial storage of cod fillets was 2 days in ice followed by 3 days at 1°C., 4 days at 2°C., and 1 day at 5°C.

(2) Solid lines represent spoilage rates at constant temperatures. Horizontal dotted lines represent changes in storage temperature. Diagonal dotted lines represent number of days the cod fillets held at the indicated temperature.

Method for estimating the final quality of cod fillets stored under specified storage conditions.

[4 figures, 2 tables, 6 references]

FTP

appears to be useful as a binder protein in sausage-like products, and (7) forms milk-like suspensions. A partially refined fish oil is produced as a co-product. The process removes Pb, Cd, and As from fish muscle but not Hg. The Hg in FPC is rapidly incorporated into and retained by the blood, kidneys, and livers of rats.

[16 figures, 15 tables, 100 references]

Authors' abstract

FTP

Chitosan is used as a coagulant to recover protein from colloidal suspension of fish meat.

Food Technology 26, No. 6, 76 (June 1972)  
Nippon Suisan Co. Ltd. (pat.)  
Japanese Patent 1633/72

## FISH PROTEIN RECOVERY



Subbaraju, R. C., and K. Krishnamurthy (Centre of Advanced Study in Marine Biology, Annamalai University, Porto Novo, Tamilnadu, India)  
Marine Biology 14, No. 1, 25-31 (May 1972)

Plankton is basic in the economy of the sea. The ecology of plankton was studied at Porto Novo, India. Plankton was collected from nearshore and estuarine waters of Porto Novo from January 1960 to December 1967. Oblique, horizontal, and vertical hauls were made at 5, 10, and 20 fathoms. The nets were made of bolting silk Nos. 10 and 20 depending on availability. The retention rate of No. 10 was 50-50% that of No. 20. Generally 3 to 5 cubic meters of water were sampled and collections were made frequently (daily or on alternate days). On occasion, because of weather, collections would be made less frequently.

Maximum plankton productivity occurred during February/March to October/November. The dominant species were diatoms, copepods, and in some months dinoflagellates. Noctiluca was dominant during August and showed two or three growth increases per year. The major component of zooplankton consisted of copepods (80 to 95% of the population).

A comparison, from the literature, made of zooplankton density in average numbers per cubic meter of water at various locations follows: using the No. 10 net--Porto Novo, (copepods only) 42,000; Block Island Sound and Long Island Sound, 48,000 and 61,000, respectively; Southampton, England, up to 32,000 and using the No. 25 net--Plymouth, England, 30,000; Kiel Bay, Germany, 142,846 (eggs included).

(over)

Lozow, Jeffrey B., and John B. Suomala (Charles Stark Draper Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02139)  
Report No. MITSG 72-8, Massachusetts Institute of Technology, Sea Grant Project, Cambridge, MA 02139 (March 1, 1972), vii + 55 + 37 pp.

A detailed analysis of basic fish abundance estimation techniques and their respective errors is presented. (No attempt is made to include hardware implementation in this note.) Echo sampling and integration schemes approach unbiased population estimates if the following details are known: a) the average target strength of the aggregation, b) the approximate "shape" or geometry of the fish aggregation, and c) the transducer directivity function, source level, voltage response, etc. It is shown that unbiased estimates of dense populations demand a priori knowledge of the geometry and distribution of the randomly assembled targets with respect to the transducer's effective volume coverage. Two typical geometries are examined; they may be loosely described as 1) thick layer of infinite expanse, and 2) thin layer of infinite expanse. The effect of the random phase components on the variance of the population estimate is demonstrated and the autocorrelation of the echo intensity is given.

[17 figures, 4 references, 6 appendices]

Authors' abstract

Yasutake, William T., and Donald F. Amend (Bureau of Sport Fisheries and Wildlife, Western Fish Disease Laboratory, Seattle, WA 98115)  
Journal of Fish Biology 4, No. 2, 261-264 (Apr. 1972)

In earlier work, infectious hematopoietic necrosis (IHN) was first isolated in 1967 from rainbow trout (*Salmo gairdneri*) and sockeye salmon (*Oncorhynchus nerka*) from British Columbia. The morphological characteristics of IHN virus and its similarities to viruses responsible for disease in sockeye and chinook salmon (*O. tshawytscha*) known as Oregon sockeye disease (OSD) and Sacramento River chinook disease (SRCD), were described in later work. Other workers found that histopathological manifestations observed in naturally occurring IHN were similar to those described in OSD and SRCD epidemics and experimental infections in sockeye.

To determine if significant pathological differences exist among the three diseases, especially in the early stages of infection, the histopathogenesis of IHN in juvenile sockeye salmon under controlled conditions was investigated. Juvenile sockeye salmon were exposed, by adding IHN virus to the water in which they were held, then transferred to troughs of free flowing uncontaminated water. Fish samples were taken every 24 hr. for histological examination and virus-concentration determinations. Virus was detected in the fish at the end of 24 hr. The most significant histopathological changes occurred 4 days after exposure. Hematopoietic tissue of the kidney being the most extensively involved. Variable degenerative changes were seen in the liver, pancreas, and in granular cells of the digestive tract. On the 4th day, maximum tissue concentration of virus was reached. On the 6th day, 30% of the fish were dead.

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 15 (over)

Lahav, M., and S. Sarig (Laboratory for Fish Diseases, Nir David, Israel)  
Bamidgeh 24, No. 1, 3-11 (Mar. 1972)

Cases of fish mortalities due to infections with the unicellular (protozoan) parasites *Chilodonella* sp. and *Costia* sp. had increased in Israel during the past years. These cases were also associated with the incidence of high numbers of *Trichodina* sp. The regular line of pesticides commonly used in fish farms against copepod parasites were not effective against the protozoan parasites. The authors, therefore, carried out tests to determine the possible use of low concentrations of formalin for the control of these parasites. The tests were designed to provide the following information: (1) the sensitivity of carp, tilapia, and gray mullet to various concentrations of formalin, (2) the effect of temperature on the toxicity of the formalin to the fishes, (3) the effect of the salinity of the water on the sensitivity of the fishes to formalin, and (4) the concentration level of formalin effective against the unicellular parasites during different time periods.

Formalin, applied to the entire fish population in a pond at a level of 30-40 p.p.m. will eradicate the unicellular parasites *Chilodonella* sp., *Costia* sp., and *Trichodina* sp. The fishes became free of parasites within 6 hr. after the beginning of the formalin treatment. When carp were exposed for 24 hr. to formalin concentrations three to four times that recommended (30-40 p.p.m.) to eradicate parasites, about 70% of the carp were adversely affected; tilapia and mullet were similarly sensitive to formalin. The toxicity of formalin to carp increased at higher temperatures (temperatures used were 15°, 20°, and 30° C.) The salinity

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 15 (over)



Cherfas, B. I. (editor) (Academy of Sciences of the USSR, Ministry of Fisheries of the USSR)  
Ichthyological Commission Ministry of Fisheries of the RSFSR, Government Scientific Research Institute of Lake and River Fisheries, 1969  
Translated from the Russian and published for the National Marine Fisheries Service and the National Science Foundation, Washington, D.C., by the Israel Department for Scientific Translations, 266 pp. (1972). Available from the U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22151. IPST Cat. No. 600424.

This publication is a collection of some papers delivered at the first All-Union Conference on Genetics, Selection, and Hybridization of Fish held in Leningrad, in 1967. Most of the papers delivered were related to carp with a few exceptions. The subject of one of these exceptions is on the Pacific salmon (p.131), and the subject of another is the variability and past history of rainbow trout (p. 221). The sturgeon and its hybrids are the subject of several papers.

The major subtopics in the collection are as follows: Genetics, heredity, and variability of fish cytology; Hybridization of fish; and Selection of fish. SW

MS [see references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

51.6

9.15 DETECTION OF ANTIBODIES TO AEROMONAS LIQUEFACIENS (0.5) IN FISH BY AN INDIRECT FLUORESCENT ANTIBODY TECHNIQUE

Lewis, D. H., and N. L. Savage (Department of Veterinary Microbiology, Texas A&M University, College Station, TX 77843, U.S.A.)  
Journal of the Fisheries Research Board of Canada 29, No. 2, 211-212 (Feb. 1972)

A technique for detecting antibodies in fish is described. It is based on the reaction between fluorescein-labeled antifish globulin and a fish antibody-antigen complex. The indirect fluorescent antibody technique may be useful in screening fish populations for various disease agents.

FTF [1 table, 5 references]

FTF [1 figure, 3 tables, 13 references]  
Three problems may develop in the use of formalin in pond water treatment. These are: (1) large volumes of a highly toxic chemical must be used and evenly distributed within the pond water. (2) Some phytoplankton and zooplankton are destroyed and may create an oxygen deficit in the pond. (3) The productivity of the pond may be reduced through use of the chemical. These problems can be overcome by lowering the amount of chemical required and the amount of formalin early in the morning so that fresh water can be added applying the formalin before nightfall.

51.6

Anonymous  
Bulletin No. 57, Technical Council for Agriculture & Fisheries (Nori-Suisan Gijyutsu Kaigi, Tokyo, Japan) (March 1972), 246 pp. (In Japanese)

This bulletin reports on a study of the reasons for the fluctuations in catch of the Japanese common squid. The various chapters deal with spawning and reproduction, distribution and migration, subpopulation aspects, and forecasting.

FTF

MS [see references 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

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THE EFFECTS OF METHOXYCHLOR ON FISHES.  
I. ACUTE TOXICITY AND BREAKDOWN STUDIES

Merna, James W. (Institute for Fisheries Research, Michigan Department of Natural Resources, Ann Arbor, Michigan), Michael E. Bender (Virginia Institute of Marine Science, Gloucester Point, VA 23062), and James R. Novy (Water Resources Commission Inland Lakes Study, Houghton Lake, MI 48629)  
Transactions of the American Fisheries Society 101, No. 2, 298-301 (Apr. 1972)

Since the ban or restricted use of DDT is in effect, methoxychlor is recommended as a substitute for control of such problems as Dutch elm disease. Substitution of methoxychlor was recommended in previous work because (1) potency against many insects is similar to DDT; (2) cost is less than many phosphate-containing insecticides; (3) metabolism by warmblooded animals is rapid. Other reports indicated that it was biodegradable in the environment and was stored in fish tissue at much lower levels than DDT.

Because of the possibility of increased use of methoxychlor, experiments were conducted to determine: (1) residual life in various aquatic environments and (2) tolerance levels (TL) in two species of fish--the fathead minnow (*Pimephales promelas*) and the yellow perch (*Perca flavescens*). The quality of water, that is, pH, amount of alkaline salts, and hardness in relation to biodegradability, was also investigated. A variety of test waters were used: distilled water at pH 7 and 9; water from Koch Warner Creek at Saline, Mich.; aged Ann Arbor tap water which had previously held fish; and water from Third Sister Lake containing plankton. The stock solution of methoxychlor contained ethanol and Triton X-100 to assure solution in the waters.

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(1.0146)

OYSTERS AND TROUT FROM SCOTTISH FISH FARMS

Hjul. Peter  
Fishing News, No. 3078, 6-7 (June 23, 1972)

A project to breed and raise oysters is located on Loch Creran near the west coast port of Oban in northern Scotland. The Highlands and Islands Development Board assisted the company in association with other investors. The Pacific oyster (*Crassostrea gigas*) was selected for rearing because it is fast growing and large. It will not breed in the colder waters surrounding the British Isles; however, it will grow in these waters when past the "eye" stage in the hatchery tanks.

The process starts with the hatchery's own brood stock kept at a temperature of 20° C. in heated, raw sea water from Loch Creran. When eggs are required, spawning is stimulated by the heat shock method (in which water surrounding the oysters is heated to about 34° C.) or by pouring an extract of minced gonads over oysters. Six hours after spawning, the fertilized egg becomes a well developed embryo. The developed embryos are separated from undeveloped eggs by passing through sieves: about 1 to 2% of the millions of eggs released survive. The developing eggs are kept in 100-gal. polythene drums. In 2 to 3 weeks the eye spot appears indicating metamorphosis is complete, the eggs having changed into young oysters. These settle on PVC sheets in the tanks. After 24 hr., the sheets are removed and the seed oysters or spat are transferred to fine mesh trays held in fiberglass tanks. The spat are held in these trays for 3 to 4 weeks and are fed plankton-enriched sea water. They are then moved to shallow concrete tanks containing warmed, unfiltered sea water. The temperature of the sea water is gradually reduced to that of the loch. The spat are placed in trays and installed in

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(0.5)

BACTERIAL POPULATION OF DIETS FOR AQUARIUM FISHES

Trust, T. J., and Vida G. Money (Department of Bacteriology and Biochemistry, University of Victoria, Victoria, British Columbia, Canada)  
Journal of the Fisheries Research Board of Canada 29, No. 4, 429-433 (Apr. 1972)

Aquarium fishes are often used in certain areas of biological research. Feeds especially designed for such fish have been developed and are offered commercially. In this study, the microbial burden of 25 of such commercially-formulated diets was determined.

One feed was sterile. The bacterial load on the remaining 24 was as shown in the table that follows.

Species of the genus *Bacillus* were the most numerous. Species of *Clostridium* (including *C. perfringens*), *enterococci*, and members of the *Enterobacteriaceae* were present in significant numbers. Apparently these aquarium fish feeds supported the growth of a wide variety of bacteria that are known to be pathogenic to fish and to man. Research workers should be aware of the presence of a variety of bacterial species in aquarium fish diets; these bacteria can affect the fish and the fishes' environment and thereby influence the results of any experiments.

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9.16  
(1.37)(9.19)

STEELHEAD MIGRATION: POTENTIAL TEMPERATURE EFFECTS  
AS INDICATED BY GILL ADENOSINE TRIPHOSPHATASE ACTIVITIES

Zaugg, W. S., B. L. Adams, and L. R. McLain (Western Fish Nutrition Laboratory, Bureau of Sport Fisheries and Wildlife, Cook, WA 98605)  
Science 176, No. 4033, 415-416 (Apr. 28, 1972)

Proposed nuclear power plants are potential thermal polluters of the Columbia River and its tributaries. In this study the authors show that water temperatures higher than 12° C. may alter the migratory behavior and the physiological condition of steelhead trout (*Salmo gairdneri*). Steelhead propagate naturally in tributaries of the Columbia and are reared in State and Federal hatcheries. Just prior to seaward migration young fish known as parr undergo adaptive biochemical and physiological change and become migratory smolts. One of the biochemical changes is an increase in the sodium and potassium ion (Na<sup>+</sup>, K<sup>+</sup>) stimulated adenosine triphosphatase activity of gill microsomes. Size appears to be a major determinant in the parr-smolt transformation. Yearling parr that fail to reach the necessary size when the migratory season arrives remain in fresh water until the following spring. However, smolts ready to migrate seaward but held in fresh water revert to parr. Reversion is accompanied by a decrease in the elevated adenosine triphosphatase activity and loss of ability to adapt to sea water. To determine the relation of adenosine triphosphatase activity to temperature, yearling steelhead trout were held in water at various temperatures during the migratory season (March to June).

The Na<sup>+</sup> and K<sup>+</sup> stimulated adenosine triphosphatase activity in steelhead held at 6.5° C. increased during parr to smolt transformation. When these fish were

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(over)

(91.6) (1.1) 91.6

galvanized tubular cages submerged in Loch Creran. There the oysters grow to market size in natural sea water protected from predators. Throughout the time that the oysters remain in the tanks, they are fed phytoplankton grown at the hatchery.

Another project supported by the Highlands and Islands Development Board is a fresh-water trout farm using the American-developed raceway method. The rainbow trout rearing begins in a hatchery located along a clear mountain stream. Eggs are brought in from Denmark, Australia, or New Zealand depending on the season. The eggs are kept in plastic troughs in warmed stream water, where they are hatched in 3 weeks. When the fry swim up in the troughs, they begin feeding on the balanced commercial food "Beta." This food is used in various particle sizes through all the growth stages of the trout. The fry are then transferred to concrete tanks outside and remain for 3 months. From there they are transported over the road to the farm and kept in round tanks for a time. The trout are then transferred to the first raceway of the block of 42. Each raceway is 104 ft. long, 6 ft. wide and 1½ ft. deep. A block of raceways covers 16 acres.

Fresh water is pumped from a nearby lake to a channel connecting the raceways and allowed to flow through them. As they grow, the trout are moved from one raceway to the next until they are market size at the last raceway. Under these conditions the trout reach 1 lb. in 11 months. The systems are efficient and men.

MS

[5 figures, 3 tables, 13 references]

(91.6) 51.6

The results indicate that the effect on breakdown of methoxychlor after 220 days. In Ann Arbor tap water and Koch Warner Creek water the half life of methoxychlor was 8 and 7 days, respectively. A high initial rate of degradation of methoxychlor was attributed to its adsorption on particles which settled and were missed in sampling. Tests on filtered Third Sister Lake water indicated a half life of 7 days in one experiment and 81 days (by extrapolation) in a second experiment. Static bioassay tests with minnow and perch yielded TL<sub>50</sub> of 7.5 g./l. and 10 g./l., respectively. Results were unreliable and rapid breakdown of methoxychlor.

Continuous flow studies were run on minnows in Ann Arbor tap water and on perch in Koch Warner Creek water. The test with minnows confirmed the static test TL<sub>50</sub>. In the continuous flow tests with perch, all fish died at methoxychlor concentrations of 0.04 g./l., and six of eight died at a level of 0.20 g./l. There were no deaths at lower levels. A TL<sub>50</sub> of 20 g./l. was indicated.

The results indicate that there may be a very narrow tolerance level below which perch are able to metabolize methoxychlor with no mortality.

MS

[5 figures, 3 tables, 13 references]

9.15 COMBINATION OF METHYL MERCURY WITH THE PROTEIN OF EGG WHITE

Irukayama, Katsuro, and Shunsuke Kuwahara (Med. Sch., Kumamoto Univ., Kumamoto, Japan)

Chemical Abstracts 76, No. 19, 108831e (May 8, 1972)

[references 1]

(91.6) (1.1) 91.6

transferred to 15° C. water, adenosine triphosphatase activity dropped sharply. Fish held at 15° C. exhibited no increase until they were transferred to 10° C. water where activity rose steadily.

To test adaptability to salt water, four fish held at 9.5° and 10° C. (increased adenosine phosphatase activity) and four fish held at 15° and 20° C. (low activity) were placed abruptly in artificial sea water at 12.5° C. All four of the fish held at 20° C. and three held at 15° C. died in 3 days. No mortalities occurred in groups held at lower temperatures.

The authors concluded that elevation of Na<sup>+</sup> and K<sup>+</sup> stimulated adenosine triphosphatase activity in gill microsome is closely associated with parr to smolt metamorphosis and may be used as an index of migration preparedness. An observed decrease in this activity because of exposure to 15° C. water reflects a loss of ability to adapt to sea water. The Federal Water Pollution Control Administration suggested provisionally that a temperature of 20° C. (68° F.) was compatible with salmonids. The authors said that 68° F. is too high, and 10° and 15° C. (50° to 59° F.) are detrimental to parr-smolt metamorphosis. The limit they suggest should be no higher than 13° C.

[1 figure, 13 references]

MS

Chemical Abstracts 76, No. 22, 131337g (May 29, 1972)

Mann, H., E. Scherf, and M. Wassermann (Inst. Kuesten-Binnenfisch., Bundesforschungsanst. Fisch., Hamburg, Germany)

Chemical Abstracts 76, No. 22, 131337g (May 29, 1972)

# INFLUENCE OF FATTY ALCOHOLS ON THE TEMPERATURE OF WATER IN CARP PONDS

9.16

(91.6) 51.6

Bacteria	Number of feed samples	Range of bacterial counts in the feeds
Aerobes	1 5 1	g./l. x 83.1 to 825 g./l. x 10 to 20 0.0 to 6 x 10 <sup>3</sup> /g.
Anaerobes	1 1 1 1 1	None detected None detected None detected None detected None detected
Enterobacteriaceae	1 1 1 1 1	None detected None detected None detected None detected None detected
Coliforms	7 8 8 8 8	None detected None detected None detected None detected None detected
Faecal coliforms	16 5 3 3 3	None detected None detected None detected None detected None detected
Enterococci	7 4 4 4 4	None detected None detected None detected None detected None detected
Clostridia	1 1 1 1 1	None detected None detected None detected None detected None detected



9.19 ENVIRONMENTAL IMPACT ANALYSIS: PHILOSOPHY & METHODS

Ditton, Robert B., and Thomas L. Goodale (editors)  
 Proceedings of the Conference on Environmental Impact Analysis, Green Bay, Wisconsin, January 4-5, 1972. Published by University of Wisconsin Sea Grant Program, 1225 West Dayton Street, Madison, WI 53706. 171 pp.

The National Environmental Policy Act of 1970 (NEPA) declares that public laws of the United States shall be interpreted and administered in accordance with newly emphasized goals of preventing and eliminating damage to the environment and biosphere, and to encourage harmony between man and his environment. The basic mechanism to carry out the spirit of NEPA is the environmental impact statement. This statement is required (by the law) to be prepared by the prime Federal agency whose actions will have a significant effect on the environment. The agency concerned must address itself to the following points: any adverse impacts which can not be avoided by the action; the alternative courses of action; the relation between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and a description of the irreversible and irretrievable commitment of resources which would occur. The impact statement must be circulated by the agency to all pertinent groups that could be interested, and no actions shall be taken for at least 30 days after the statement is made public.

Two years have elapsed since NEPA was passed. A conference was held to serve as a forum for the exchange of information among State and Federal agencies and educators on their experiences with NEPA. The exchanges were communicated in the form of papers delivered at the conference. The papers were segregated into the

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9.19 POTENTIAL ENVIRONMENTAL EFFECTS OF AN OFFSHORE SUBMERGED NUCLEAR POWER PLANT

Anonymous  
 General Dynamics, Electric Boat Division, Groton, CT 06340. Vol. I and II, 29 pp. (June 1971). Prepared for Water Quality Research Office, Environmental Protection Agency, Contract No. 14-12-918. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Order No. EP2.10:161310GF106/71; Price \$2.25.

Potential environmental effects of wastes from an 1190-MWE pressurized water nuclear power plant. submerged 250 ft. deep at four representative sites off the U.S. mainland, were studied. The thermal field of the plant's cooling water discharge, and the distribution of radionuclides in the sea, were analyzed. In every case, the thermal "mixing zone" (by the most stringent present standards) was found to end before either a surface or subsurface field was established, and the zone was found to be much smaller than for a plant in shallower waters.

Fewer organisms would be killed by entrainment in the cooling water than at a coastal plant. A "batch" release of radionuclides, after the worst hypothetical nuclear accident, was calculated. The surrounding biota would be harmed; suspension of local fishing would be required for about 10 weeks. No potential ecological damage was predictable from the ordinary minute release of radionuclides, the thermal discharge, or other wastes. SW

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9.19 (6.133)(4.80)

RESIDUES OF ORGANOCHLORINE PESTICIDES AND POLYCHLORINATED BIPHENYLS IN SOME COMMERCIALLY PRODUCED CANADIAN MARINE OILS

Addison, R. F., M. E. Zinck (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada), and R. G. Ackman (Fisheries Research Board of Canada, Halifax Laboratory, P.O. Box 429, Halifax, Nova Scotia)  
 Journal of the Fisheries Research Board of Canada 29, No. 4, 349-355 (Apr. 1972)

Pesticide residues absorbed by plants and ingested by animals are concentrated in their depot fats. Many of such fats of marine animal origin are processed commercially and are consumed by animals and man. For example, herring, seal, and whale oils serve as the raw material for some fat products for human consumption. This article reports on a survey of the organochlorine residues in some marine oils produced commercially over the past 20 years from fish of the Gulf of St. Lawrence and the western North Atlantic Ocean. The purpose was to establish a range of values likely to be encountered in marine oils and to serve as a reference base in future studies. Data on some oils produced elsewhere from marine species were included.

Herring oils produced in the late 1960's from Gulf of St. Lawrence herring contained from 7 to 17 p.p.m. of DDT complex (p,p'DDE, p,p'DDD, p,p'DDT), about 0.1 p.p.m. of dieldrin, and up to 11 p.p.m. of PCBs. The oils produced in the spring showed higher residue levels than those produced in the autumn. Herring oils contained up to 8 p.p.m. of DDT complex, about 4 p.p.m. of PCBs, and no dieldrin. North Atlantic whale oils contained up to 44 p.p.m. of DDT complex; a

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9.19 (1.3) DETOXIFICATION OF KRAFT PULP MILL EFFLUENT BY AN AERATED LAGOON

Servizi, J. A., and R. W. Gordon  
 International Pacific Salmon Fisheries Commission Progress Report No. 26, 24 pp. (1972) (New Westminster, British Columbia, Canada)

A pulp and paper mill is located along the Thompson River, 3 miles upstream of Kamloops Lake in British Columbia. The Thompson River is part of the migration route to their native spawning grounds for more than a million sockeye salmon.

Millions of sockeye smolts move down stream in spring during their journey to the ocean. In addition, young sockeye fry move downstream past the mill to Kamloops Lake where they live for 1 year before departing for the ocean. The Thompson River downstream of Kamloops Lake supports a variety of salmonids and is the spawning ground for pink salmon. To protect water quality and the fisheries of the Thompson River system, mill effluent was required by the Canada Department of the Environment, Fisheries Service to meet certain standards including minimum biological oxygen demand (BOD) reductions of 60%. The standards required also, that young salmon survive an acute toxicity test consisting of 4 days' exposure to a mixture of 65 parts treated effluent and 35 parts river water.

Occasional substandard detoxification of the mill effluent during treatment in an aerated lagoon caused studies to be undertaken seeking the cause. Results of the study indicated that biological treatment in an aerated lagoon was generally capable of detoxifying kraft pulp mill effluent to meet standards, but with exceptions. Further, diversion of black liquor spills to the aerated lagoon often caused substandard detoxification. It was found that spills of black liquor should

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Stewart, Richard D., Terrance N. Fisher, Michael J. Hosko, Jack E. Peterson, Edward D. Barett, Hugh C. Dodd (Department of Environmental Medicine, Medical College of Wisconsin, Allen-Bradley Laboratory, 8700 West Wisconsin Ave., Milwaukee, WI 53226)  
Science 176, No. 4032, 295-296 (Apr. 21, 1972)

Dichloromethane (or methylene chloride) is a widely used solvent and degreaser. Inhalation of dichloromethane vapor in concentrations of 500 to 1,000 P.P.M. caused formation of carbon monoxide after 1-2 hours' exposure in human subjects. [1 figure, 6 references]

SW

ALJ  
[3 figures, 6 references]

This report describes the authors' study of the effects of carbon monoxide on the blood of subjects exposed to dichloromethane vapor. The subjects were exposed to a concentration of 500 to 1,000 P.P.M. of dichloromethane vapor for 1-2 hours. The results showed that the subjects exposed to dichloromethane vapor had a significant increase in the level of carbon monoxide in their blood. The authors conclude that the exposure to dichloromethane vapor can cause the formation of carbon monoxide in the body.

(08'7)(3CT'9) 61'6

TOXIKOLOGISCHE UNTERSUCHUNG VON EMULGATOREN FÜR DIE  
BEKÄMPFUNG VON ÖLVERSCHMUTZUNGEN  
[TOXICOLOGICAL EXAMINATION OF EMULSIFIERS USED IN THE  
CONTROL OF OIL POLLUTION]

Bock, K. J., and H. Mann (Institute for Coastal and Inland Fisheries, Federal Research Institute for Fisheries, Hamburg, Germany)  
Archiv für Fischereiwissenschaft 22, No. 1, 64-67 (June 1972) (In German, English summary)

Fourteen samples of special oil dispersing products were tested as to their toxicities to organisms from fresh water, brackish water, and sea water. When used up to a concentration of 200 mg./l., the materials were not toxic to the organisms. The products of the fatty-acid-polyglycolic-ester type seem to be of more practical importance.

[3 tables, 4 references]

FTP

[3 figures, 8 tables, 7 references]

Fourteen samples of special oil dispersing products were tested as to their toxicities to organisms from fresh water, brackish water, and sea water. When used up to a concentration of 200 mg./l., the materials were not toxic to the organisms. The products of the fatty-acid-polyglycolic-ester type seem to be of more practical importance.

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(3'1) 61'6

Johnson, Oscar (FMC Corporation, Middleport, NY 14105)  
Chemical Week 110, No. 25, 33-48, 53-64, 66 (June 21, 1972)

Growth in the pesticides industry has all but stopped due to increasing opposition from environmentalists, more stringent Federal and State regulations, and new application techniques that require smaller amounts of the chemicals. The industry is trying to develop pest-control products and application practices that are environmentally sound. As a result, pressure on the industry is beginning to ease and the producers expect that production and sales will increase again, possibly returning to the industry's historic 10 to 12% yearly growth rate by the end of the 1970's. The article includes a list of the leading producers of pesticides and their addresses. Tables are included that summarize information on pesticides including (1) products and producers, (2) U.S. patents and date of issue, (3) chemical name and structural formula, (4) physical properties, (5) product form, (6) oral toxicity LD50, (7) major end uses, and (8) estimated production for 1971. One hundred and forty-six products are listed.

FTP

This article discusses the growth of the pesticides industry and the challenges it faces. It mentions that the industry has all but stopped due to increasing opposition from environmentalists, more stringent Federal and State regulations, and new application techniques that require smaller amounts of the chemicals. The industry is trying to develop pest-control products and application practices that are environmentally sound. As a result, pressure on the industry is beginning to ease and the producers expect that production and sales will increase again, possibly returning to the industry's historic 10 to 12% yearly growth rate by the end of the 1970's. The article includes a list of the leading producers of pesticides and their addresses. Tables are included that summarize information on pesticides including (1) products and producers, (2) U.S. patents and date of issue, (3) chemical name and structural formula, (4) physical properties, (5) product form, (6) oral toxicity LD50, (7) major end uses, and (8) estimated production for 1971. One hundred and forty-six products are listed.

61'6

Abstract of the following references:

[References 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100]

The following references are included in this abstract:

1. Bock, K. J., and H. Mann. 1972. Toxikologische Untersuchung von Emulgatoren für die Bekämpfung von Ölverschmutzungen. Archiv für Fischereiwissenschaft 22, No. 1, 64-67.

2. Johnson, Oscar. 1972. Pesticides '72. Part 1. Chemical Week 110, No. 25, 33-48, 53-64, 66.

3. This study was undertaken to determine the effect of a sublethal concentration of mercury on the metabolism of adult male and female fiddler crabs, *Uca pugnator*. The crabs were maintained under optimum and stressful conditions of temperature and salinity, and the synergistic effects on survival of this species with sublethal concentration of mercury in combination with salinity and thermal stress. This species was selected because it is one of the more abundant and ecologically important species in an estuarine ecosystem.

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9.19 VOLATILITY OF DDT AND RELATED COMPOUNDS

Spencer, William F., and Mark M. Cliath (Soil and Water Conservation Research Division, ARS, U.S. Department of Agriculture, University of California, Riverside, CA 92502)

Journal of Agricultural and Food Chemistry 20, No. 3, 645-649 (May-June 1972)

Volatilization and vapor phase transport are important processes in the dissipation of pesticides, including the so-called "nonvolatile" pesticides such as DDT. This article gives data on the vapor pressure and relative volatility of some DDT isomers, impurities in the technical material, and potential breakdown products; and it examines their behavior when applied to soil.

The vapor densities of DDT and related compounds were determined by a saturation method. In this technique N<sub>2</sub> gas was passed through insecticide-treated sand or soil at a sufficiently slow rate to insure equilibrium vapor saturation [the procedure is described by W. F. Spencer and M. M. Cliath, *Environ. Sci. Technol.* 3, 670 (1969)].

In order to study the vapor phase desorption and potential volatility of the chemicals from soil, technical grade DDT was added to Gila silt loam (a calcareous, desert soil containing 6% organic matter and 18.4% clay). Some of the samples of soil treated with DDT were air dried to 2.2% water content to provide data on the effect of soil water content on the vapor density of DDT. The competitive effect of certain other pesticides on the vapor density of DDT was examined by applying either P,P'-DDT or o,p'-DDT to Gila silt loam with and without the addition of the other (accessory) pesticide. The accessory pesticide was either the other isomer of DDT or recrystallized dieldrin.

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9.19 CONTAMINATION OF THE SEAS AND OCEANS BY ARTIFICIAL RADIO ACTIVITY

Preston, A. (Ministry of Agriculture, Fisheries and Food, Fisheries Radiobiological Laboratory, Lowestoft, Suffolk, United Kingdom)

Underwater Journal and Information Bulletin, No. 2, 49-58 (Apr. 1972)

Controlled disposal of radioactive waste to the marine environment has been practiced for over 25 years. International concern over such practices led to studies which endorsed the view that low and intermediate level radioactive wastes could be safely disposed of into the sea under properly controlled conditions. The International Atomic Energy Agency Report, IAEA (1961): Radioactive Waste Disposal Into the Sea. IAEA Safety Series No. 5, 174 pp. IAEA, Vienna, Austria, was the first document to give detailed guidance at an international level for the controlled disposal of a toxic waste material into the sea. The prime objective of controlled disposal of radioactive wastes is to ensure that irradiation of the public remains within the International Commission on Radiological Protection recommended dose limits. If these limits are instituted, damage to marine resources will be negligible. Control is achieved by assessing the potential consequences of any proposed disposal, prior to operation, by application of critical path analysis techniques, which includes a quantitative assessment of the habits of the public leading to radiation exposure. A limiting environmental capacity for radioactive materials is thus established. Within this capacity, disposal will be permitted only to an extent commensurate with the justifiable needs of the operator. Economic, social, and political considerations must be also taken into account. Thus only a fraction of the limiting environmental capacity will be used.

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9.19 DDT RESIDUES IN WHITE CROAKERS

Castle, William T., and Leon A. Woods, Jr. (Wildlife Management Branch, California Department of Fish and Game)

California Fish and Game 58, No. 3, 198-203 (July 1972)

The level of DDT residues in white croaker (*Gonyonemus lineatus*) flesh (group A) and flesh with the skin left on (group B) was determined by gas liquid chromatography. The percent fat in group A and group B also was determined. There are significant differences ( $P < .01$ ) between levels of DDT and between the percent fat in the two groups. The fat determined for group A was 3.76% (SE = 0.37%) and for group B was 6.06% (SE = 0.48%). The total DDT residue (including pp'DDT, its metabolites, and isomers) for group A was 10.82 ppm (SE = 0.96 ppm) and for group B was 18.23 ppm (SE = 1.95 ppm). The only residues detected at the limit of detection of 0.01 ppm were 1,1-dichloro-2-(o-chlorophenyl)-2-(p-chlorophenyl)ethylene, (op',-DDE); 1,1,1-trichloro-2-(o-chlorophenyl)-2-(p-chlorophenyl)ethane, (op'DDT); 1,1-dichloro-2,2-bis(p-chlorophenyl)ethane, (pp'DDD); and 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane, (pp'DDT). Many of the samples analyzed exceeded U.S. Food and Drug Administration guideline tolerance of 5.0 ppm wet weight for total DDT. [1 figure, 3 tables, 10 references]

Authors' abstract

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9.19 INTERACTION OF VITAMIN A AND DIELDRIN ON MALLARD LIVER LIPIDS AND BIOTIN CONTENT

Nelson, J. R., L. E. Wooley, C. F. Nockels, and J. V. Shutze (Department of Avian Science, Colorado University, Fort Collins, CO 80521)

Poultry Science 51, No. 3, 747-751 (May 1972)

Earlier work has shown that chronic ingestion of a low level of a pesticide by wild birds may not produce immediately recognizable toxicity symptoms but may cause an imbalance of some aspect of the metabolic processes. In this study, the effects of ingestion of low levels of dieldrin by Mallards on vitamin A utilization was examined.

Day-old Mallard ducks were used. They were placed on a basal vitamin A deficient ration to make them marginally deficient so that the influence of dieldrin on subsequent utilization of vitamin A could be determined. Dieldrin was administered to the Mallards daily for a period of 12 weeks at the rate of 1.0 mg./kg. of body weight. The dieldrin was mixed with a protein base and appropriate quantities of the mixture were placed in gelatin capsules. The capsule containing the dieldrin was administered to the ducks by placing it at the base of the duck's tongue and flushing the mouth with water. The experimental diet was fed to the ducks for 12 weeks (at the end of this period the ducks were 18 weeks old).

After 12 weeks on the experimental diet containing dieldrin, the ducks showed no gross symptoms of dieldrin toxicity. After 5 weeks on the experimental diet, the ducks fed dieldrin showed marked footpad keratinization. The vitamin A levels in the livers of the ducks were not affected by chronic ingestion by the ducks of 1.0 mg./kg. of body weight of dieldrin. The biotin level in the liver of the

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6.55 (6.195)(9.2)	THE BRITISH COLUMBIA RANDOM SAMPLE EGG LAYING TEST: EVALUATION OF SIX COMMERCIAL LAYER RATIONS WITH TWO STRAINS OF PULLETS  Biely, Jacob (University of British Columbia, Vancouver, British Columbia, Canada), C. W. Wood, and W. H. Pope (British Columbia Department of Agriculture, Victoria, B.C., Canada) Feedstuffs 44, No. 25, 33-34, 36 (June 19, 1972)  The standard egg laying test was conducted with mature pullets reared on a poultryman's premises and sent to the test station prior to onset of laying. About 20 years ago the random-sample egg laying test began to replace the standard test.  The random-sample test is carried out with baby chicks hatched at the testing station from eggs collected at random from the breeders' farms, representing the type of stock offered for sale to the commercial poultry man.  The purpose of the test is to assess the production characteristics of dif- ferent strains of birds under similar environmental conditions of brooding, rearing, and laying. The standard conditions make it possible to make a valid comparison of the economic traits of different strains of stock. One of the criteria most often used in assessing the economic potential of a strain is the income over feed and pullet cost. The popularity of the tests and related competition among breeders has led to strains of birds with high egg production. These improvements have been supported by the development of feeds which stimulate the laying bird to produce large numbers of high-quality eggs. In addition, efficiency of feed con- version has improved.  (over)	
9.2	INCORPORATING A FISHING BUSINESS  Smith, Frederick J. (Marine Economics, Oregon State University, Corvallis, OR 97331) Extension Marine Advisory Program, No. 11, 8 pp. (n.d.) Oregon State University Corvallis, OR 97331  This manual is intended to assist in determining whether or not to incorpo- rate a small fishing business. It lists a number of considerations including man- agement, ownership, liability, taxation, finance and fringe benefits. A review of these considerations provides a basis for deciding whether to employ an incor- poration specialist. This manual is not a substitute for the services such a specialist provides.  This manual discusses a number of considerations regarding the incorporation of a fishing business. These are: 1. Division of ownership is more feasible within a corporation. 2. The corporation may have a perpetual life and the business transferred from generation to generation regardless of the life span of various individuals involved. 3. Operation and management of a corporation usually implies more clearly specified management responsibilities and procedures but may be more complicated than with a proprietorship. 4. Owners of a corporation assume liability up to their share of ownership while the proprietor may be liable up to the value of his entire business and personal property.  (over)	

9.3 (2.05)	COMMUNICATING WITH THE CONSUMER. SPECIAL REPORT: PART II. SAFETY OF FOOD SUPPLY  Foster, E. M. (Food Research Institute, University of Wisconsin, Madison, WI 53706) Food Product Development 6, No. 4, 76, 78, 80 (June-July 1972)  Safety of the food supply is in question by those who argue that Americans are being poisoned by chemical additives in their food and by environmental con- taminants such as pesticide residues, mercury, and microorganisms. The author surveyed food safety in the United States. All types of food poisoning are esti- mated to affect from 5 to 20 million people annually. In 1969, 91% of food poison- ing cases was caused by microorganisms or their toxic products. The U.S. Food and Drug Administration (FDA) has labeled microbiological contamination the primary problem. Organisms that cause botulism and salmonella contamination are the best known. Staphylococcal and perfringens poisonings combined account for over half of all food borne disease. Commercially prepared foods are rarely involved and commercially canned foods almost never. Most cases are caused by improper prepa- ration or handling of the food. The FDA continually inspects processed foods for Salmonella. When such contamination is found the product is removed from the mar- ket. Thirty-one recalls were made in 1970, and most of them involved dried milk, raw eggs, or egg-containing pasta products.  Convenience foods [for example, cake mixes, precooked fish] are popular in America. They require chemical additives for a variety of purposes: to prevent caking, emulsify fat, inhibit rancidity, inhibit microbial spoilage, neutralize acid, increase viscosity, and for other purposes. Consumer groups oppose the ad- dition of these chemicals to foods. They accuse the regulatory agencies of laxity  (over)	COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 23
9.3 (9.17)	PYRRHIC VICTORIES FOR THE FRIENDS OF WHALES  Anonymous Nature 238, No. 5358, 4 (July 7, 1972)  Results of the annual meeting of the International Whaling Commission (IWC) produced mixed reactions among academic, government, and business interests. J. L. McHugh, chairman of the IWC, indicated the achievements of the meeting as: (1) a complete and indefinite ban on the taking of blue, right, gray, bowhead, and hump- back whales; (2) the introduction of international observers on all whaling ves- sels; (3) the abolition of the "blue whale unit" (the unit equates 1 blue whale to 2 fin whales, to 2.5 humpback whales, and to 6 sei whales); (4) reduction of catch quotas on the endangered species and the introduction of a quota on the minke whale; (5) the creation of a committee to examine the procedures of the IWC. The 1971 catch and quota data and the whale quotas for 1972-73 are shown in the table.  (over)	COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 10 PAGE 23

5. Corporations pay taxes at one of two rates while the rates for a proprietor range from 14 to 70 percent in 24 steps. Taxation procedures for a corporation can be much more complicated than for the proprietor and the total tax may be higher.

6. A number of fringe benefits such as group insurance, profit sharing and retirement plans can be obtained by incorporating.

7. Incorporating may make it more feasible to borrow money and makes it possible to issue stock to the public to raise money.

8. Incorporating usually requires more records and paperwork. Although this requires more time and probably more accounting expense, it may also improve the management and profitability of the business.

9. A corporation normally incurs more legal and accounting expenses than a proprietorship, not only in the process of incorporating but in conducting its business each year.

Author's abstract and summary

Volkov, V. S. (U.S.S.R.)  
Chemical Abstracts 76, No. 9, 44134v (Feb. 28, 1972)

#### 8.5 (7.51) ELECTROPHORETIC ANALYSIS OF SERUM PROTEINS IN THE BLOOD OF THE NORTHWESTERN ATLANTIC SILVER HAKE

Other experiments with nutrients, in conjunction with the random test, have been conducted in Canada and the United States. In one test, birds were fed a ration containing 17.2% protein until egg production reached 50%. Then they received a ration in which the protein was reduced to 13.4%. No change occurred in egg production which was realized in an 0.018 per pullet increase in profit. Variations in energy content were tested in layer rations. Low-energy layer rations realized higher egg profits.

In experiments which varied the source of protein in egg laying rations, no significant results were found using additives of soybean meal or animal protein concentrates. At the request of the Canadian poultry industry six commercial layer rations were tested by the random-sample method. Chemical analysis of feed samples were undertaken to establish the amount of nutrients. Wide variations in amount of nutrients in rations from each source were found indicating the need for better quality control in feed preparation. Two strains of Leghorn-type chickens were tested. The egg laying characteristics of both strains were high. The averages were 262.2 eggs in 364 days per bird for strain 1 and 258.8 eggs per bird for strain 2. Differences in feed consumption were significant and related to wide differences in fat content of the feeds. There were marked differences in egg yolk color indicating a need for enriching the feeds with grain containing xanthophyll. The annual mortality rate for strain 1 was 12.1% and 5.7% for strain 2. The net income per bird of strain 1 was \$3.06 and \$3.56 for strain 2, a difference of \$0.50 which was not considered to be significant.

Any conclusions that may be drawn from these test results must be made with reservations since many intangible factors may affect egg production.

MS

[uncensored, 9 tables, 9 references]

#### 9.3 (9.17)

Area	Species of whales	Quota for 1972-73	Catch in 1971	Quota in 1971
Antarctic	Fin	1,950	2,683	2,300 BWU <sup>1</sup>
	Sei	5,000	5,456	
	Minkie	5,000	3,020 <sup>2</sup>	
North Pacific	Fin	650	732	1,046
	Sei	3,000	3,463	3,768
	Sperm, Male		7,328	10,841
	Sperm, Female	6,000		
	Male	4,000		
Southern Hemisphere	Sperm, Male	8,000	10,796	No quota
	Female	5,000		
Total		38,600	41,000 <sup>3</sup>	

<sup>1</sup> BWU = Blue Whale Units

<sup>2</sup> Not included in the Blue Whale Unit  
<sup>3</sup> Approximately. Includes all the large whales in all areas, but does not include several thousand small whales and more than 250,000 dolphins which are not protected.

[1]

FTP

#### 9.3 (2.05)

toward the food industry they are supposed to regulate by not restricting use of the additives. The author indicates that only substances generally regarded as safe (GRAS) are used with FDA approval; all other chemicals must be approved by the FDA. The author disagrees with allegations that the regulatory agencies are too heavily influenced by the food industry to the detriment of the consumer.

The FDA has done relatively little direct testing of food additives for safety. Operation of the National Center for Toxicological Research in Arkansas will provide for large-scale studies of additives. Food-processing companies have taken many steps to protect the consumer. It is in their interest to do so. They have increased their scientific competence to improve processing, assure adequate quality control, remove hazards from processing and product, and support research on food safety. The mission of the Food Research Institute, which the author heads, is to generate, assemble, and distribute information on safety of foods. University, State, Federal, and private foundation funds support many of the Institute's operations. A substantial share of funding is given by the food industry. The author believes that the control system is working, but all parties concerned should be alert to changing operations and new scientific information.

Umemoto, Shigeru (Tokai Reg. Fish. Lab., Tokyo, Japan)  
Chemical Abstracts 76, No. 15, 84590x (Apr. 10, 1972)

#### 8.51 (0.6) GEL FRACTION IN FISH MUSCLE PROTEIN EXTRACTS. II. PROPERTIES OF GEL FRACTION PROTEIN



## Anonymous

Prepared by the Subcommittee on Feed Consumption, Committee on Animal Nutrition, Agricultural Board, National Research Council, United States and Committee on Feed Composition, Research Branch, Department of Agriculture, Canada Available from the National Academy of Sciences, 2101 Constitution Ave., Washington, DC 20418 (1971), xvi + 772 pp. Price \$12.50.

This book records the names of feeds and analytical data on feeds that have been published in various books, bulletins, and regulations. The tables of feed composition contain data on 6,152 feeds; data are presented on "as fed" and "dry" basis; a coefficient of variation for each nutrient for which there are four or more analyses; data on the digestible and metabolizable energy of feeds for cattle, horses, sheep, and swine; the metabolizable energy of the feeds commonly fed to poultry; and the net energy of some cattle feeds. The tables should be useful to feed manufacturers, feed dealers, nutrition consultants, research specialists, government agencies, teachers, students, county agricultural agents, and farmers.

Badawi, H. K. (Inst. Oceanogr. Fish., Alexandria, U.A.R.)  
Chemical Abstracts 76, No. 15, 83755t (Apr. 10, 1972)

8.50  
(8.0)

CHEMICAL COMPOSITION OF THE RED CRAB PORTUNUS PELAGICUS

Longhurst, Alan (Institute for Marine Environmental Research, Plymouth, England),  
Michael Colebrook, John Gulland, Robin Le Brasseur, Carl Lorenzen, and Paul  
Smith

New Scientist 54, No. 798, 500-502 (June 1, 1972)

In the study of man's influence on life in the oceans, we must, first, realize that man's effects in the open ocean are not inherently improbable because of the vastness of the ocean, and, secondly, inasmuch as large-scale fluctuations in the populations of marine organisms occur naturally we must not assume that these natural fluctuations reflect the effects of man and his technology. The authors discuss briefly natural fluctuations of marine organisms that have occurred throughout the world including the anchovy populations off the California coast, the sardine population off Japan, and the cod and haddock resources in the North Sea. The fluctuations in abundance of these species were correlated with certain natural environmental and biological changes.

The ocean is a restless and changing environment; its changes may be sudden and dramatic or may be covert and sustained for very long periods. These changes can be revealed and measured only by widespread and sustained ocean monitoring operations. But, pollution monitoring programs can be successful only if the natural changes in the physical environment are monitored continuously and indefinitely and are understood. Natural fluctuations in populations of marine animals already have been incorrectly ascribed to the effects of pollutants. A serious impact on the environment could pass unnoticed through ignorance of the instability of natural populations or through a lack of monitoring of the oceans. [4 figures]

McGrath, William L. (Operations Europe, Carrier Overseas Corporation, London, England)  
ASHRAE Journal 14, No. 6, 56-59 (June 1972)

The author is an official of an air-conditioner manufacturing firm. He reviewed the history of air conditioning in homes and office buildings in relation to trends of rising income, population, and urbanization. The high demand for environmental control in domestic and commercial buildings in the near past and present was mentioned. These trends have led to the following developments: (1) a crisis in the availability of electrical energy at peak load demand, (2) a shortage of nonpolluting fuel, (3) defective urban ecology, (4) solid waste disposal problems, (5) air pollution, (6) spreading water pollution, and (7) fire control problems in tall buildings.

The author suggests that by 1984 the concept of environmental control will be broader than what is meant by the terms "heating" and "ventilation." The new concept will be associated with a new respect for the value of energy; design practices and development of technology will conform to the new view. The change will be reflected in buildings designed to conserve energy, air conditioning systems that use less electrical energy, and environmental systems that capture waste energy to reduce total energy demand. Based on complete environmental control, new low-cost housing designs and community ecology will make efficient use of land resources through high-density dispersal.

Carlberg, Stigr. (Fishery Board of Sweden) (editor)  
Cooperative Research Report Series A, No. 29, 145 p  
Council for the Exploration of the Sea, Charl-  
lottenlund, Denmark)

During the period January 1969-April 1970, the Baltic oceanographers carried out a big cooperative project called the International Baltic Year. All nations bordering the Baltic participated. Numerous oceanographic and biological samples were collected; standardized methods of analysis were required. To meet this requirement a manual was produced for that project. A new edition of that manual was published and major subtopics in it are as follows: Station network (of the Baltic Sea); General comments on the chemical methods; Salinity and the carbonate system; Oxygen conditions; Nutrients (inorganic); Organic matter (nonnutrient); Determination of reactive arsenate; Optical methods; and Biological methods (sampling techniques, measurement of photosynthetic production, fish eggs and larvae).

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Davis, P.	9	2.06	Learson, R. J.	10	2.3	Smith, Frederick J.	23	9.2
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--	5	0.7	Le Brasseur, Robin	25	9.10	Soderquist, M. R.	8	0.8
De Halperin, Delia R.	13	6.3	Lechner, Jack	9	1.3	Spaulding, P. L.	3	0.5
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Ditton, Robert B. (ed.)	19	9.19	Lewis, D.	7	0.7	Stauffer, C. E.	4	0.6
Dodd, Hugh C.	20	9.15	Lewis, D. H.	16	9.15	Stewart, Richard D.	20	9.15
Dodd, Hugh C.	7	1.0146	Li, Kwan-Ming	10	2.9	Subbaraju, R. C.	15	9.10
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			Lorenzen, Carl	25	9.10	Toda, Jun	5	0.6
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Fessman, G. (pat.)	10	3.4						
-- (pat.)	10	3.4						

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## COMMERCIAL FISHERIES ABSTRACTS

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NUMBER 11

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# UNITED STATES DEPARTMENT OF COMMERCE

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## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



0.33 A BINDING PROTEIN FOR FATTY ACIDS IN CYTOSOL OF INTESTINAL MUCOSA, LIVER, MYOCARDIUM, AND OTHER TISSUES

Ockner, Robert K., Joan A. Manning, Ruth B. Poppenhansen, and William K. L. Ho (Department of Medicine, University of California School of Medicine, San Francisco, CA 94122)  
Science **177**, No. 4043, 56-58 (July 7, 1972)

Translocation of fatty acids from cell surface to endoplasmic reticulum and mitochondria is fundamental to the absorption of lipids in the intestine and to utilization of fatty acids in plasma by liver, muscle, and other tissues. Although long chain fatty acids are poorly soluble in aqueous media, a mechanism to account for the ease with which they traverse the cytosol (aqueous cytoplasm) was unknown.

In studies of the intestinal absorption of long chain fatty acids, apparent differences in esterification rates of saturated and unsaturated fatty acids were postulated to be due to different rates of their translocation from the microvillus membrane [of the intestine] to the site of their activation in the endoplasmic reticulum.

An investigation of these differences resulted in the discovery of a protein, which binds long chain fatty acids and certain other lipids, in the cytosol of jejunal mucosa, liver, myocardium, adipose tissue, and kidney. Binding is non-covalent and is greater for unsaturated than for saturated and medium chain fatty acids.

Binding of long chain fatty acids by this protein is greater than that of other anions tested, including sulfbromophthalein, and it does not depend on negative charge alone. Binding appeared to be related to length and saturation of (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 11 PAGE 1

0.35 ON THE BIOSYNTHESIS OF INSULIN IN ANGLERFISH ISLETS

Yamaji, Kenji, Kozue Tada, and Anthony C. Trakatellis (Department of Biochemistry, Mount Sinai School of Medicine of the City University of New York, New York, NY 10029)  
Journal of Biological Chemistry **247**, No. 12, 4080-4088 (June 25, 1972)

Earlier work has shown that insulin is synthesized via a single chain precursor or proinsulin. A. C. Trakatellis and G. P. Schwartz [Nature **225**, 548-549 (1970)] described the participation of a proinsulin in insulin biosynthesis in anglerfish islets and the isolation and composition of anglerfish proinsulin. In the present paper, the authors report the isolation and determination of structure of a key intermediate form derived from proinsulin in its conversion to insulin. The intermediate has the structure of insulin with the additional amino-acid residues Gly-Thr-Lys attached to the NH<sub>2</sub> terminus of the A chain. The intermediate can be produced *in vitro* by a rapid tryptic enzyme cleavage of anglerfish proinsulin. More extensive treatment with trypsin converts the intermediate to insulin.

The authors propose that the biosynthesis of insulin in the islets of anglerfish proceeds through two sequential steps: a rapid enzymic hydrolysis of proinsulin to yield an intermediate and then a slow hydrolysis of the insulin intermediate to produce insulin. Also, they suggest that it is possible that one trypticlike enzyme operates in both steps.

[16 figures, 4 tables, 22 references]

FTP

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0.39 DAILY VARIATION IN CONCENTRATION OF CORTISOL IN PLASMA IN INTACT AND HYPOPHYSECTOMIZED GULF KILLIFISH

Srivastava, Anil K., and Albert H. Meier (Department of Zoology and Physiology, Louisiana State University, Baton Rouge, LA 70803)  
Science **177**, No. 4044, 185-187 (July 14, 1972)

The adrenocortical (interrenal) tissue of teleost fish is stimulated by adrenocorticotrophic hormone (ACTH) secreted by the anterior lobe of the pituitary gland. Hypophysectomy results in a decrease in the plasma concentration of cortisol, the major corticosteroid in poeciliid fishes, and a regression of the adrenocortical tissue. Daily rhythms in the concentration of plasma glucocorticoids have been reported for teleosts. Other work has indicated that daily rhythms of adrenal steroids in mammals are synchronized by the photoperiod; furthermore, rhythms in concentration of the glucocorticoids in plasma are thought to be direct consequences of daily rhythms of ACTH release. If this assumption is correct for teleosts, hypophysectomy should not only cause a reduction in concentrations of cortisol in plasma but also should result in a loss of the daily rhythm. This assumption was tested in the following manner.

Two groups of intact fish, and two groups of hypophysectomized fish were maintained on a 12-hr. daily photoperiod; one group of each category was exposed to light beginning at 0800 (series 1), and the remaining group from each category was exposed at 2000 (series 2). After 15 days the fish were killed at intervals of 4, 8, and 12 hr. After the onset of light, the concentration of cortisol in the plasma of each fish was determined by the corticosteroid-binding globulin method. (over)

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0.38 REDUCED PYRIDINE NUCLEOTIDE BINDING TO BEEF LIVER AND DOGFISH LIVER GLUTAMATE DEHYDROGENASES

Malencik, Dean A., and Sonia R. Anderson (Department of Biochemistry and Biophysics, Oregon State University, Corvallis, OR 97331)  
Biochemistry **11**, No. 15, 2766-2771 (July 18, 1972)

This paper reports on fluorescence and circular dichroism studies of the binding of NADH (nicotinamide adenine dinucleotide, reduced form) and NADPH (nicotinamide adenine dinucleotide phosphate, reduced form) to BL-GDH (beef liver glutamate dehydrogenase), in the presence and in the absence of the effectors GTP (guanosine 5'-triphosphate) and ADP (adenosine 5'-diphosphate). Parallel experiments with Pacific dogfish liver glutamate dehydrogenase (DF-GDH), a nonassociating form of the enzyme, were carried out in order to examine the role of association in coenzyme binding. Comparative examination of the two enzymes is interesting; the authors indicate, because the dogfish is a primitive vertebrate, having diverged from the main vertebrate evolutionary line about 400 million years ago. BL-GDH binds six moles of NADPH in the presence and in the absence of GTP. There are multiple sites for NADH. In the presence of GTP, 18 sites/hexamer were fluorometrically titrated. Six of these sites are equivalent to the NADPH binding sites. The coenzyme binding equilibrium of BL-GDH is independent of the concentration of protein in the range tested of from 0.2 to 2 mg./ml. DF-GDH, a nonassociating form of the enzyme, is NAD<sup>+</sup> (H) specific but shows the same heterogeneity in the binding of NADH.

[9 figures, 1 table, 29 references]

FTP

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0.35  
(9.13)

GROWTH HORMONE- AND PROLACTIN-LIKE PROTEINS OF THE  
BLUE SHARK (PRIONACE GLAUCA)

Lewis, U. J. (Division of Endocrinology, Scripps Clinic and Research Foundation, La Jolla, CA 92037), R. N. P. Singh, B. K. Seavey, R. Lasker, and Grace E. Pickford  
Fishery Bulletin 70, No. 3, 933-939 (July 1972)

The two major disc-electrophoretic components, designated as "slow" and "fast" which are seen in fresh homogenates of the pars distalis of the blue shark (Prionace glauca) pituitary gland were isolated. Some alteration of the proteins occurred during the purification as evidenced by appearance of a slightly faster migrating band in each. The slow component and its altered form had a molecular weight of 22,000 daltons; the fast, and its modified form, 20,000 daltons. The two proteins were very similar chemically and immunologically, but definite differences were noted. Both gave a precipitin line with antiserum to mouse growth hormone, although quantitatively different, but neither reacted to antiserum to mouse prolactin. The peptide maps of the two proteins were identical except for three peptides. Both contained two moles of tryptophan and six half-cysteine residues. These results indicate that the pars distalis of the blue shark contains two very similar proteins that resemble both growth hormone and prolactin of mammals.

Authors' abstract

[7 figures, 1 table, 14 references]

0.36

fatty acid chains which indicates that the interaction between them and the protein may be specific and/or hydrophobic.

The presence of this binding protein may explain differences in rates of intestinal absorption among fatty acids; furthermore, the protein may participate in the utilization of long chain fatty acids and lipid soluble drugs and toxins by many mammalian tissues.

[1 figure, 1 table, 15 references]

WS

0.38

ISOLATION AND PROPERTIES OF LUCIFERASE, A NON-HEME PEROXIDASE,  
FROM THE BIOLUMINESCENT EARTHWORM, DIPLOCARDIA LONGA

Bellisario, Ronald, Terry E. Spencer, and Milton J. Cormier (Department of Biochemistry, University of Georgia, Athens, GA 30601)  
Biochemistry 11, No. 12, 2256-2266 (June 6, 1972)

Earlier work has demonstrated that luciferin, luciferase, and  $H_2O_2$  are required for the *in vitro* emission of light from the earthworm *D. longa*, expressed as follows:



In this paper, the authors present evidence that luciferin and luciferase are located within the coelomic cells of the bioluminescent earthworm. The blue-green luminescence, arising from the coelomic fluid exuded by the worm following mechanical or electrical stimulation, has an unstructured peak emission at  $19,700\text{ cm}^{-1}$  (507 nm) with a half-width of  $3,070\text{ cm}^{-1}$  (78 nm). The highly purified form of luciferase isolated from the coelomic cells of *D. longa* had an approximate molecular weight of 300,000, and the enzyme appears to be highly asymmetric. Its absorption and fluorescence spectra are those of a typical protein. The enzyme is irreversibly inactivated by  $H_2O_2$ , and one molecule of  $H_2O_2$  per luciferase site apparently is required for this inactivation. Therefore, luciferase during the light reaction does not exhibit normal enzymatic catalysis.

[12 figures, 3 tables, 37 references]

FTP

0.39

The results indicated that daily variation in concentrations of cortisol in plasma occurred in both categories of fish, which proves that the pituitary is not required for this variation; instead, the authors suggest that it is synchronized by the daily photoperiod.

The concentrations of cortisol in plasma of intact fish in series 2 was higher compared to the same category in series 1. The adjustment of an animal to the inverted photoperiod (2000 to 0800) might constitute a stress that is expressed as an elevation of cortisol in plasma. This reaction did not occur in hypophysectomized fish in series 2. The authors suggest that the stress response depends on the presence of the pituitary, whereas the rhythm of cortisol concentrations in plasma does not.

The retention of adrenal function of hypophysectomized fish indicated by cortisol in the plasma during the experiment was helpful in demonstrating that the daily rhythm of cortisol in plasma is not dependent on the hypophysis.

[1 figure, 1 table, 16 references]

WS

0.33  
(6.32)

INTERACTION BETWEEN RED SEAWEED MUCILAGE AND ACRIDINE BASES

Akahane, Tooru, and Kakuji Katsura (Numazu Tech. Coll., Numazu, Japan)  
Chemical Abstracts 76, No. 23, 137231q (June 5, 1972)

Levi, Alan S., and Nathan O. Kaplan (Dep. Chem., Univ. California, La Jolla, Calif.)  
Chemical Abstracts 76, No. 9, 43314s (Feb. 28, 1972)

ROLE OF THE REDUCED DIPHOSPHOPYRIDINE NUCLEOTIDE  
IN THE REACTIVATION OF DOGFISH MUSCLE LACTATE DEHYDROGENASE

0.38



0.35  
(9.12)

NEW OBSERVATIONS ON THE LIPIDS OF AQUATIC ORIGIN

Yamada, Minoru (Faculty of Fisheries, Hokkaido University, Hakodate, Japan)  
Memoirs of the Faculty of Fisheries Hokkaido University 19, Nos. 1/2, 35-136 (1972)  
(Publication Committee, Faculty of Fisheries, Hokkaido University, Minato-cho, Hakodate, 040, Japan)

The purpose of this study was to obtain background information leading to a better understanding of how the fatty acids characteristic of the marine fishes are produced; through what pathway the lipids which contain large amounts of wax esters, as in sperm whale oil, are produced; how the large amounts of higher hydrocarbons, as found in shark liver oil, are produced; and how large amounts of acyl glyceryl esters, as in the lipid of certain marine organisms, are produced. In addition, elucidation of the functions of these lipids in the marine organisms was desired. Data were also collected on the general properties--fatty acid composition and the unsaponifiable matter--of the lipids of the plankton upon which the fishes fed. The lipids of 14 marine teleosts, 4 fresh-water teleosts, 1 elasmobranch, 2 cephalopods, and 1 shellfish were examined. The lipids of 15 species of plankton were examined.

[41 figures, 85 tables, 99 references]

FTP

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0.6

UTILIZATION OF SOYBEAN PRODUCTS IN FISH PASTE PRODUCTS

Yasumatsu, Katsuharu, Masaru Misaki, Toshio Tawada, Koshichi Sawada, Jun Toda, and Kiyofumi Ishii (Food Research Laboratories, Food Products Division, Takeda Chemical Industries, Ltd., Osaka, Japan)  
Agricultural and Biological Chemistry 36, No. 5, 737-744 (May 1972)

Certain commercially available food-grade soybean products are used in the production of kamaboko, chikuwa, fish sausage, and certain fish paste products. The purpose of the present work was to examine the quality of kamaboko when prepared from various commercial soybean products. An attempt was made to correlate the various chemical and physical characteristics of the soybean products with the quality of the kamaboko prepared from these products. Forty-three soybean products were used in the tests; 6 soy protein isolates, 10 soy protein extracts, 7 soy protein concentrates, and 20 soy flours. All were in the form of a powder. Frozen surimi of suketo-tara Theragra chalcogramma, without added salt, was used. The frozen surimi was thawed. Salt to a level of 2.5%, soybean product to a level of 5%, and water to a level of 10% were added to the thawed surimi. The mixture was then ground for 10 min. in a mill. The ground material was stuffed into casings and the sausages were heated in hot (85° C.) water for 50 min. The cooked sausages were cooled in water then stored for 1 day at 5° C. The kamaboko, prepared in this manner, was used as the test sample. It was found that the quality of the kamaboko varied with the batch of surimi used. Therefore, the kamaboko prepared from one specific soy protein concentrate was used as the standard reference sample; all test samples were compared with the standard reference samples. Quality of the kamaboko was measured by sensory and objective tests. Sensory

(over)

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0.6  
(0.35)

RAPID ROUTINE TESTS FOR PORK SAUSAGES

Pearson, D. (National College of Food Technology, Weybridge, England)  
Food Manufacture 47, No. 4, 45-46, 53 (Apr. 1972)

Statutory standards require factory control laboratories to examine increasing numbers of samples. If more rapid techniques were available in performing analyses for standard qualities there would be savings in time and other costs. The author applied techniques for determining total meat content (65% minimum), and sulfur dioxide (450 p.p.m. maximum) in pork sausage, which were more rapid than conventional methods. The results of these tests correlated reasonably well with results obtained using recognized reference methods. He also suggested rapid techniques for determining water, fat, protein, and ash. The author suggests very strongly that meticulous care should be taken in preparing a good homogeneous sample of any meat product for tests.

[1 figure, 10 references]

SW

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This is short report, translated from Russian, on the occurrence, general composition and flavor of krill. L.F.

Reprinted

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BIRMINGHAM Abstracts 25, No. 6, Abstract No. 2097, 424 (June 1972)

Korotky, R.  
Nutrition, Lond. 26, No. 1, 41-42 (1972)

(KRILL) PROTEIN FIELDS IN THE ANTARCTIC

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 11 PAGE 3

0.6

EFFECTS OF MICROWAVES ON FOOD AND RELATED MATERIALS

Rosen, Carl-Gustaf (University of Stockholm, Sweden)  
Food Technology 26, No. 7, 36-37, 39, 40, 55 (July 1972)

The author discusses the possible interactions of microwaves on food and similar material.

The quantum energy of microwaves is too low to cause any chemical changes due to the direct interaction with molecules and chemical bonds. It is possible that the electric field associated with microwaves might cause electric orientation effects on subcellular particles, and thus may disturb cell division. These influences are probably of medical significance, and they may not have a lasting impact on microwave-heated food. However, in microwave-accelerated freeze-drying of foods, the corona discharge (which develops under vacuum conditions) may induce undesirable chemical reactions in the foods.

Information to date indicates that the effects of microwaves on biological materials is of thermal origin.

[2 tables, 14 references]

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9.0

evaluations were made for color, flavor, texture, and overall quality. The Okada Gelometer was used to obtain values for breaking stress, breaking strain, breaking work, softness, and penetrating rate. The Texturometer was used to obtain values for hardness, cohesiveness, springiness, and gumminess.

The kamaboko samples containing added soy protein isolates had high texture scores and low color ratings; the samples with added soy protein concentrates had high texture scores and color ratings; the samples with added soy protein extracts had low texture scores and color ratings; and samples with added soy flours had low texture scores and color ratings. The textural quality of the kamaboko varied directly with the amount of protein supplied by the soybean product. No correlation was found between texture of the kamaboko and the amount of fiber or fat in the soybean products. There was positive correlation between the "hardness" of the kamaboko and the degree of denaturation of the protein of the added soybean products and with the amount of nitrogen of the soybean products not dispersible in 3% sodium chloride solution. No correlation seemed to exist between the textural properties of kamaboko (containing added soybean products) and the textural properties of the heat-coagulated gels of the corresponding soybean products.

[5 figures, 6 tables, 9 references]

Chemical Abstracts 76, No. 25, 152330q (June 19, 1972)

Moeller, Hans G. (Dragoco Spezialfabrik Konz. Rleeh-Und Aromastoffe Gerberding and Co. G.m.b.H. (pat.)

German Patent 1,908,900

0.6 FOOD FLAVORING CONCENTRATES

DEVELOPMENT OF SENSITIVITY TO TETRODOTOXIN IN BEATING CHICK EMBRYO HEARTS, SINGLE CELLS, AND AGGREGATES

(2.9)

McDonald, Terence F., Howard G. Sachs, and Robert L. DeHaan (Department of Embryology, Carnegie Institution of Washington, Baltimore, MD 21210)

Science 176, No. 4040, 1248-1250 (June 16, 1972)

Earlier work has shown that tetrodotoxin specifically blocks inward sodium current in certain excitable tissues (including heart tissue) and abolishes spontaneous activity in cells in which the action potential is dependent on a transient increase in sodium conductance. Such a mechanism is involved in the generation of action potential in the embryonic chick heart--the inward sodium current in the heart (adult) tissue is blocked by tetrodotoxin. In the present study, the effect of tetrodotoxin on the spontaneous beating of chick embryo heart preparations (whole hearts, single isolated cells, and aggregates of dissociated cells) were examined.

It was found that: (1) Chick embryo hearts, at 4 days of age, are not sensitive to tetrodotoxin at  $10^{-5}$  g./ml. ( $3 \times 10^{-5}$  M), but they were increasingly sensitive to the toxin between 4 and 7 days, after which their sensitivity remained constant; (2) only a small fraction of the isolated cells were sensitive to tetrodotoxin, and the sensitivity of the fraction did not increase with the age of the embryo; and (3) the aggregates formed from single cells responded to tetrodotoxin similarly to the response shown by the intact embryonic heart.

[2 tables, 26 references]

FTP

0.8 (9.16)

TEMPERATURE CONTROL SYSTEM FOR RECIRCULATION FISH-HOLDING FACILITIES

Scott, K. R. (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba R3T 2N6, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 7, 1082-1083 (July 1972)

The temperature control system described here can be adapted to existing recirculating fish-holding facilities. It will maintain temperatures within  $\pm 0.06^\circ$  C. within the range of  $2^\circ$  to  $20^\circ$  C. in two 200-gal. tanks (using a modulating electronic temperature controller). Heating and cooling are done in a stainless-steel combination cooler-and-heater unit; heating is by an electrical resistance element and cooling is by a water-cooled hermetic refrigeration compressor. The unit includes heating, refrigerating, filtering, and aerating devices.

[3 figures, 1 table, 2 references]

FTP

DIETARY MANIFESTATIONS OF FLUORIDE FROM FISH PROTEIN CONCENTRATE ON THE MOUSE DENTITION

0.7

Kerley, Michael A. (Texas A & M Univ., College Station, Tex.)

Chemical Abstracts 77, No. 1, 1326n (July 3, 1972)

0.7 FEEDING POULTRY MANURE TO ANIMALS

Couch, J. R. (Department of Poultry Science, Texas A&M University, College Station, TX 77840)

Feedstuffs 44, No. 31, 24-26 (July 31, 1972)

Dehydrated poultry waste (DPW) consists of feces collected from hens held in laying cages and not contaminated with litter. The feces are dehydrated in a rotary-type drum dryer. Research into the addition to feeds of DPW was reviewed. DPW can be fed to laying hens without detrimental effects on their health or to the flavor of their eggs. DPW has a low energy content and the nutrients it contains are not fully utilized. The laying hen eats to satisfy energy requirements. Consequently feed consumption increased proportionately in relation to the percentage of DPW in the diet in order to satisfy caloric needs. High phosphorus content with associated amino acids makes DPW a preferred source of phosphorus. Because of low energy content, DPW in feeds for broilers and turkeys is not indicated. The author concluded that inclusion of DPW in a feed formula for poultry increases feed consumption, lowers feed efficiency, and increases feces production.

Results from research on swine indicated that no more than 5% DPW should be included in rations to avoid adverse effects on growth rate and feed conversion. The author corresponded with 40 nutritionists to ascertain the usefulness of DPW. There was unanimous agreement that the best use of DPW is in rations for ruminants (cattle and sheep). The rumen of these animals contains bacteria capable of converting nonprotein nitrogen to bacterial nitrogen which can be used by the host animal.

[14 references]

SW



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"Export Outlook for Indian Marine Products," by C. Cherian; "Are There Enough Shrimps in the Sea?" by S. Z. Qasim; "Fisheries Development in India" by R. Raghu Prasad; "Zebra Fishes Pteroinae: Scorpaenidae Value as Aquarium Fishes" by K. V. Ramo Rao; "The Shrimp Zoom" by Robert S. Russel; "Some Microbiological Problems Associated With Fish Sausage Manufacture" by J. R. Yermal, T. S. M. Dasai, T. C. Chandrasekhar, Gopalakrishna Shenoy; "Brighter Prospects Ahead" by Edward Rivlin; "Net Economic Yield and the Problem of Over-Fishing With Particular Reference to Shrimp Fishery Off Karala Coast" by B. S. Saxena; "Credit for Fishing Industry" by K. S. Bhullar; "Are Our Mechanical Fishing Boats Viable" by A. Sachidanandam; "More Fish From Deep Sea" by Shri. H. G. Vartak; "A Suggestion to Practice Shrimp Farming To Augment the Raw Material Supply for the Seafood Industry" by C. T. Samuel; "Why a Professional Degree Course in Fisheries" by K. V. Sekharan; "Survey of India's Export Potential of Marine Products by the Indian Institute of Foreign Trade-An Analysis" by S. V. Goghale; "Scientific Utilization of Fishery Wealth Imperative" by Irving P. Farber; "A Profile of the Deep Sea Fishery Resources Off the Southwest Coast of India" by K. M. Joseph; "A Review of the Program (over)

## 2.1 GRID SORTERS AID CONSERVATION OF ROCK LOBSTER

(1.87)

Anonymous

Australian Fisheries 31, No. 6, 8-9 (June 1972) (Reprinted from South African Shipping News)

Until recently the contents of lobster traps were dumped on the deck where they were later sorted. The undersized lobsters were returned to the sea. Delays between emptying the trap and sorting resulted in injury of lobsters due to exposure to the sun, and many were physically damaged by the crush on deck. The lobsters which lay longest on the deck were those nearest the legal minimum size because they had to be measured. It was estimated that these lobsters were exposed to the most injury and constituted a large proportion of the following season's crop. In a single season the average boat caught about 40,000 rock lobster for processing but probably returned between 200,000 and 300,000 lobsters below the legal minimum size.

Traps with escape gaps were used to overcome the capture of undersize lobsters. However, when the trap contained more than a certain amount of lobsters, the escape gaps were inaccessible to many of the undersized individuals. These undersized lobsters were brought to the surface, sorted (and often injured), and returned to the sea.

To mitigate the problem of injury to the undersized lobster a South African rock lobster catching and processing firm has caused to be developed a deck-mounted sorting grill. The catch from a trap are exposed to the grill, and the undersize lobsters escape through gaps in the grill to the sea without handling. (over)

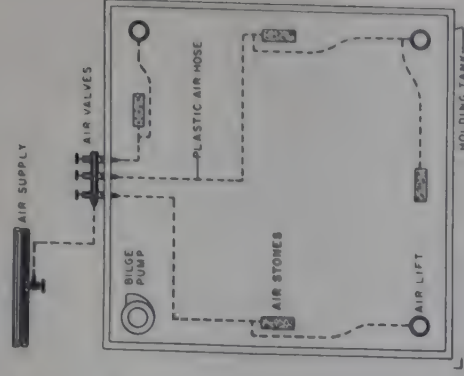
## 2.15 SHIPBOARD PROCEDURES TO DECREASE LOBSTER MORTALITY

Smolowitz, Ronald Joel (NOAA Corps, National Marine Fisheries Service, Woods Hole, MA 02543)  
Commercial Fisheries Review 34, Nos. 5-6, 44-48 (May-June 1972)

The development of the offshore lobster fishery has created a need to decrease lobster mortality during long periods of storage onboard ship. This paper discusses aspects of the shipboard-storage problem and presents one successful method now in operation.

The major causes of lobster mortality after capture are: a) suffocation, b) thermal shock, c) rough handling, and d) disease.

Diagrams of a holding tank air system and of a deck holding tank follow.



HOLDING TANK AIR SYSTEM  
(Layout of the air system  
at the bottom of the tank)

## 2.119

## STUDIES ON THE ICE ACCUMULATION ON SHIPS.

## III. ON THE PREVENTION OF ICING ON SHIPS BY MEMBRANOUS WATER

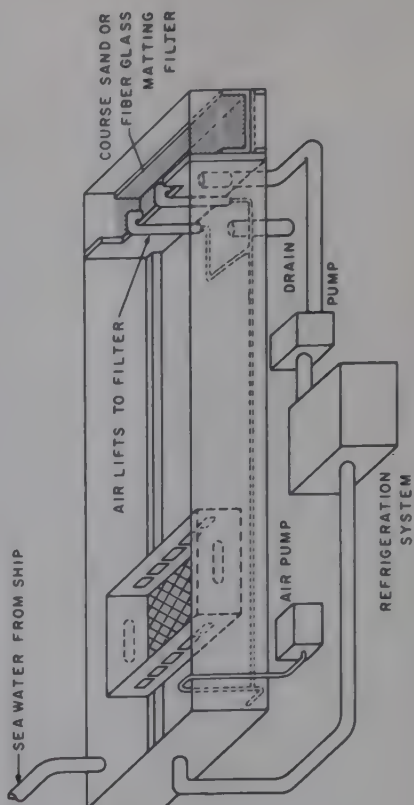
Morimura, Shinji (Laboratory of Fishing-Boat Industry, Faculty of Fisheries, Hokkaido University)

Bulletin of the Faculty of Fisheries Hokkaido University 23, No. 1, 29-38 (May 1972)

This paper briefly describes laboratory and field tests aimed at developing a means of preventing the icing on ships at sea. The concept involved the use of a running, continuous ("membranous") film of heated water flowing over the surface of the vessel affected by icing. Tests in the laboratory were made on stainless-steel and rubber sheeting surfaces. Field tests were made on an offshore dragnet boat and a pelagic trawler. The cooling water from the vessels' engines was used to provide the running water film. Rubber sheeting was applied to the vessels. The heated water is flowed over the surface of the sheeting to prevent icing. According to the author, on one of the fishing vessels the running water area was maintained in a safe condition as far as icing was concerned under conditions of  $-5^{\circ}\text{C}$ . air temperature,  $0^{\circ}\text{C}$ . sea-water temperature, and 4 on the Beaufort wind scale. The water applied at the upper edge of the diffusive rubber sheeting (for prevention of icing) was  $35^{\circ}\text{C}$ . and reached a temperature of only  $27^{\circ}\text{C}$ . at the lower edge. The author believes that these tests indicate that the concept may eventually be applied in the prevention of icing aboard ship. [6 figures, 1 table, 4 references]

FTP

DECK HOLDING TANK  
(Concept of deck lobster-holding tank using tray storage)



2.15

2.1121 MAKING AND MENDING NETS. PART NINE:  
CONCLUDING THE MENDING-IN OF SHOOTERS, AND GOING ON  
TO REPAIR THE LOWER WINGS AND BOSOM

Buckingham, Harry  
World Fishing 21, No. 6, 28-29 (June 1972)

When the new net has been joined across the widest part of the damaged net, the selvage must be mended in. An illustration shows how to cut selvage out of sheet netting. Mending a torn net with staples still intact is also illustrated; mending a small rip along the flymeshes is described.

There are illustrations and a description on repairing a net that has had the quartermesh torn out, with the bosom meshes, and fly meshes on either side of the quarter missing completely.

[4 diagrams]

SW

[1 figure]

A trawl that has an area torn completely out is repaired by working into the edges of the remaining net a new section of netting, known as a shooter. The size of the shooter is calculated; an illustration shows the trimming of the old net and the mending required to install the shooter.

World Fishing 21, No. 5, 54-55 (May 1972)

## Anonymous

2.1121 MAKING AND MENDING NETS. PART 8--TORN-OUT BELLIES AND MENDING IN "SHOOTERS"

2.00 DIMETHYL SULFIDE AS AN ODOR COMPONENT IN NOVA SCOTIA

## FALL MACKEREL

Ackman, R. G., and J. Hingley (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada), and K. T. Mackay (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 7, 1085-1088 (July 1972).

Mackerel taken in the fall of 1971 off Halifax, Nova Scotia, Canada, showed a strong petroleum refinerylike odor. The odor was identified as dimethyl sulfide that originated from the stomach contents of the fish. The odor was specifically associated with the pteropod Spiratella retroversa.  
[2 tables, 15 references]

FTP

GOVINDAN, UTILIZATION OF MISCELLANEOUS FISH IN INDIA BY D. P. DEEN AND S. S. SINGH, *Journal of the Marine Biological Association of India*, 1969, 11, 1-10, 10 pp., 1 fig., 1 table, 1 map, 12 refs., 10 cm., 1969, SW

for the Development of Marine Products in the State With Special Reference to Exports" by S. P. Balasubrahmanyam; "Basic Food From the Sea" by C. P. Gopinathan; "Culture of Predatory Fishes" by K. H. Menon; "An Answer to the Problem of Protein Starvation" by N. Balakrishnan Nair; "Recent Trends of Research in Coastal Aquaculture" by V. Gopalakrishnan; "Fishing Boats Out of Steel and Cement ('Ferro Cement') World Opinion" by R. Balasubrahmanyam; "Western Coastal Shrimp Fishing Industry in the Doldrums" by M. Krishna Raj; "Skirmishes of Fishing Grounds" by S. Dutt; "Theory and Practice of Tagging With Reference to Commercially Important Fishes of India" by K. M. Kewaramani; "'Convenience' Foods From Fish" by T. K. Ravindran; "Utilization of Miscellaneous Fish in India" by D. P. Sen and C. S. Ravindran.

1.0152

### 2.3 APPARATUS FOR CONVEYING FISH

Veb Volkswerft Stralsund (W. Gnoth and R. Menzel) (pat.) (German Democratic Republic)

BFMIRA Abstracts 25, No. 7, Abstract No. 2734, 548 (July 1972)

A conveyor for transporting fresh fish in an orderly manner to and from cutting and cleaning devices arranged along the conveyor is described. Reprinted

[1 photograph]

Experiments were performed with the grid and traps to determine how effective either system is in conservation of the lobster fishery. Results of the experiments indicated that traps with escape gaps released about half of the undersize lobsters that would have escaped through the sorting grid. All the company's 20 boats are now fitted with the sorting grids.

The grid measures 3 ft. by 5 ft. with steel bars spaced 2 in. apart. The grid is made of tubular steel and light sheet metal or hardboard. It is mounted with a chute running from the grid to a hole in the gunwale. When the trap is hoisted aboard it is held above the grid onto which the lobsters are released. Undersize lobsters drop through the grid unassisted, those of legal size are removed by hand, and the rest are placed in the undersize trap.

2.1 (1.87)



2.3 UPTAKE OF BACTERIOPHAGE AND THEIR SUBSEQUENT SURVIVAL  
(0.5) IN EDIBLE WEST COAST CRABS AFTER PROCESSING

DiGirolamo, R., L. Wiczynski, M. Daley, F. Miranda, and C. Vliehweger (Department of Biology, College of Notre Dame, Belmont, CA 94002)  
Applied Microbiology 23, No. 6, 1073-1076 (June 1972)

Earlier work has shown that molluscs (oysters, mussels, and clams) and certain crabs can become contaminated with virus by feeding off contaminated shellfish or as a result of living in polluted waters. In the present study, a series of experiments were carried out to determine the major sites of viral residence within crabs and the amount of virus surviving the edible crabs after cooking by boiling in salted water. Dungeness crab (*Cancer magister*) and "Red Rock" crab (*C. antennarius*) were used in these tests because they are the principal edible crabs found off the California coast and because they are normally cooked by boiling prior to being eaten. Coliphage T4 was the virus model used in all the experiments. Crabs were held for 48 hr. in aquaria containing sea water purposely contaminated with coliphage T4 (virus count of about  $2.6 \times 10^6$  plaque-forming units (PFU) per milliliter). Samples of sea water and of crabs were collected and examined after 0, 12, 24, 48 hr. intervals.

The edible crabs, when held in coliphage T4 contaminated sea water, accumulated high titers of the virus. From 26% to 29% of the virus was found in the crab muscle (the portion of the animal normally eaten). When the contaminated crabs were boiled in salted water (0.5 g. of NaCl per liter), the bacteriophage were inactivated relatively rapidly. Nevertheless, after 10 min. of cooking, 10% of the coliphage survived, and after 20 min. of cooking, 2.5% of the coliphage (over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 11 PAGE 7

2.3 REDUCTION OF ANTITHIAMINE ACTIVITY IN CRAYFISH  
(0.38)(2.9) BY HEAT TREATMENTS

Rutledge, James E., and Levi C. Ying (Department of Food Science, Louisiana State University, Baton Rouge, LA 70803)  
Journal of Food Science 37, No. 3, 497-498 (May-June 1972)

Earlier work has shown that different antithiamine factors exist in different species of fish and in the same fish. The authors previously found antithiamine substances in the fresh-water crayfish (*Procambarus clarkii*). The present article reports on the effects of boiling and drying the crayfish on the antithiamine activity in the organism.

The tail meat and the abdomen of the crayfish did not contain the antithiamine factor; however, the material from the cephalothorax region of the crayfish showed high antithiamine activity (3.70  $\mu\text{g./mln./g.}$ ).

Boiling the crayfish in water for 30 min. or oven drying them at 100° C. for 24 hr. did not destroy all the antithiamine material in the organisms. The authors were not sure whether the crayfish contained a heat stable antithiamine factor or whether the assay procedure was inadequate. Data on the antithiamine activity in raw and heated crayfish cephalothorax are shown in the table that follows. (over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 11 PAGE 7

3.15 DEVELOPMENT OF IRRADIATION STERILIZED CODFISH CAKES

Heiligman, F., and Lucy J. Rice (Food Laboratory, U.S. Army Laboratories, Natick, MA 01760)  
Journal of Food Science 37, No. 3, 420-422 (May-June 1972)

Earlier, R. O. Sinnhuber, M. K. Landers, T. C. Yu, M. Simon, and F. Heiligman [Food Technol. 22, 1570 (1968)] prepared irradiation sterilized codfish cakes and halibut cakes that were acceptable up to 12 months of storage at 21° C. However, some darkening of the cakes occurred. Subsequent experiments using antioxidant did not result in cakes of any longer keeping quality or of improved flavor. In the present study, experiments were carried out with codfish cakes to confirm the earlier work of Sinnhuber et al. and to extend the work in the development of process criteria for producing a shelf stable, highly acceptable fish product that can be used in mass feeding systems.

The codfish cakes were prepared from frozen codfish fillets. The thawed fillets were ground, and 4 lb. of white corn meal and 1½ lb. of gelatin Viscomix, and ½ lb. salt were added to and mixed with 100 lb. of ground codfish fillets. The mixture was stuffed into regenerated cellulose meat casings. The product was heated in boiling water until a center temperature of 80° to 85° C. was reached (to inactivate the autolytic enzymes) and the heated product was allowed to cool overnight in a 4° C. refrigerator. The casings were removed, and the codfish rolls were cut into 1.25-cm.-thick slices. The samples were then packed in enamel-lined cans under vacuum and in laminated (Mylar/aluminum foil/medium density polyethylene) pouches under vacuum. A porous packet of activated charcoal was added to each can prior to closing it under vacuum. The samples were frozen at (over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 11 PAGE 7

3.2342 IMMERSION FREEZING OF FISH IN DICHLORODIFLUOROMETHANE

Bucholz, Shyrl B., and George M. Pigott (Institute for Food Science and Technology, College of Fisheries, University of Washington, Seattle, WA 98105)  
Journal of Food Science 37, No. 3, 416-419 (May-June 1972)

Several dichlorodifluoromethane (DDM) commercial freezers are in use for processing fruits and vegetables. A small freezer for freezing shrimp has been described by F. K. Lawler [Food Eng. 41, 7 (1969)]. DDM has been approved for use on foods [Federal Register, Friday, Sept. 8, 32, 174 (1967)]. DDM has a boiling point of -21.6° C. and shows a heat transfer coefficient of 38.7 B.t.u./hr. ft.<sup>2</sup> F.; these characteristics make DDM suitable for freezing food. L. Crawford, B. Finch, and J. Daly (Food Technol. 23, 4 (1969)) indicated that there was some advantage to the use of DDM for freezing tuna. The present study dealt with the freezing of king salmon steaks in DDM and subsequent storage at +5° F.

Samples of king salmon steaks were immersed in DDM (-21.6° F.) until the center of the steak reached +15° F. The steaks were then wrapped in Saran film and placed in frozen (+5° F.) storage. For comparative purposes samples were frozen in an air blast freezer at -30° F. and in a liquid nitrogen-booster air blast freezer at -70° F. These samples were handled, packaged, and stored similarly to those that had been frozen in DDM. Samples for chemical and taste panel evaluations were taken from storage 1 week after freezing, and each month thereafter for a total of 6 months. The objective tests for quality of the steaks consisted of the 2-thiobarbituric acid (TBA) test for measurement of malonaldehyde and of the peroxide number determination. (over)

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 11 PAGE 7

### 3.15 $\gamma$ -RADIATION PRESERVATION OF SOME FISH PRODUCTS

Kardashev, A. V., A. T. Karnet, and L. L. Kozlova (U.S.S.R.)  
Chemical Abstracts 77, No. 1, 3909d (July 3, 1972)

FTL [5 figures, 5 tables, 14 references]

The king salmon steaks frozen by immersion in DDM were comparable in quality to those frozen by regular commercial methods (air blast and liquid nitrogen-for-tified air blast). The quality of the salmon steaks was not affected by contact of the fish with DDM. The objective tests indicated that DDM did not alter the tendency of the lipids of the fish toward rancidity. Extraction of data from the two freezing time nomographs presented in the article revealed the following freezing times in liquid DDM: Freezing time in minutes for unpackaged filets of low-fat, white-fleshed fish was  $\approx 2\frac{1}{2}$  min. for 0.3-in.-thick filets,  $\approx 6\frac{1}{2}$  min. for 0.6-in.-thick filets, and  $\approx 24$  min. for 1.4-in.-thick filets. Freezing times in minutes for such filets packaged in heat-shrunk cryovac film was  $\approx 3.0$  min. for 0.3-in.-thick filets,  $\approx 8\frac{1}{2}$  min. for 0.6-in.-thick filets, and  $\approx 30$  min. for 1.4-in.-thick filets. The loss in weight after freezing of the salmon filets was 0.11% for those frozen in DDM, 0.8% for those frozen in liquid nitrogen-boasted air blast, and 1.2% for those frozen in an air blast.

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### 3.15 MICROFLORA OF FISH AND FISH PRODUCTS DURING $\gamma$ -RADIATION TREATMENT

Dutova, E. N., M. M. Goftarsh, S. K. Kozyreva (U.S.S.R.)  
Chemical Abstracts 77, No. 1, 3894v (July 3, 1972)

FTL [5 figures, 5 tables, 14 references]

The king salmon steaks frozen by immersion in DDM were comparable in quality to those frozen by regular commercial methods (air blast and liquid nitrogen-for-tified air blast). The quality of the salmon steaks was not affected by contact of the fish with DDM. The objective tests indicated that DDM did not alter the tendency of the lipids of the fish toward rancidity. Extraction of data from the two freezing time nomographs presented in the article revealed the following freezing times in liquid DDM: Freezing time in minutes for unpackaged filets of low-fat, white-fleshed fish was  $\approx 2\frac{1}{2}$  min. for 0.3-in.-thick filets,  $\approx 6\frac{1}{2}$  min. for 0.6-in.-thick filets, and  $\approx 24$  min. for 1.4-in.-thick filets. Freezing times in minutes for such filets packaged in heat-shrunk cryovac film was  $\approx 3.0$  min. for 0.3-in.-thick filets,  $\approx 8\frac{1}{2}$  min. for 0.6-in.-thick filets, and  $\approx 30$  min. for 1.4-in.-thick filets. The loss in weight after freezing of the salmon filets was 0.11% for those frozen in DDM, 0.8% for those frozen in liquid nitrogen-boasted air blast, and 1.2% for those frozen in an air blast.

### 3.15 SOME CHEMICAL CHANGES IN IRRADIATED SEAFOODS

King, Frederick J., Joseph M. Mendelsohn, Donald F. Gadbois, and Julius B. Bernstein (Atlantic Fishery Products Center, NOAA, U.S. Department of Commerce, Gloucester, MA 01930)  
Radiation Research Reviews 2, 399-415 (1972) (Elsevier Publishing Co., Amsterdam, Netherlands)

Although considerable progress has been made in the technology of radiation preservation of seafood, there is still a need for basic chemical information on the effects of irradiating seafoods. This paper discusses the current state of knowledge in the chemistry of irradiated seafoods. The chemical constituents of seafoods are affected by irradiation in several ways. For pasteurizing doses of irradiation, the order of magnitude of the chemical changes in seafoods is similar to that due to the effects of storage or cooking of nonirradiated seafoods. [1 figure, 3 tables, 75 references]

FTL

FTL [5 figures, 5 tables, 14 references]

### 0.38 FLAGELLAR ATPASE FROM SEA URCHIN SPERMATOCYTES

#### I. PURIFICATION AND SOME PROPERTIES OF THE ENZYME

Ogawa, Kazuo, and Hideo Mohri (Dep. Biol., Tokyo Metrop. Univ., Tokyo, Japan)  
Chemical Abstracts 76, No. 17, 96162x (Apr. 24, 1972)

FTL [1 table, 1 figure, 11 references]

By definition, a unit is the amount of thiamine destroyed per minute.

Item	Raw, fresh	Boiled for 5 min.	Boiled for 30 min.	Oven dried at 100° C. for 24 hr.
Amount of thiamine destroyed (units/g.)	3.70 ± 0.32	1.02 ± 0.14	0.89 ± 0.07	0.52 ± 0.05
Reduction due to heat treatment (%)	--	72.3	75.8	85.6
Specific activity (units/g./min.)	0.110 ± 0.010	0.0030 ± 0.0003	0.0020 ± 0.0002	0.0015 ± 0.0001



3.2493 PHOSPHOLIPID CHANGES IN MUSCLE FROM FROZEN STORED LAKE MICHIGAN COHO SALMON

Braddock, R. J., and L. R. Dugan, Jr. (Department of Food Science & Human Nutrition, Michigan State University, East Lansing, MI 48823) *Journal of Food Science* **37**, No. 3, 426-429 (May-June 1972)

Increases in free fatty acid (FFA) content of fish muscle during frozen storage are primarily due to the hydrolysis of phospholipids catalyzed by phospholipases. Earlier work has shown that this increase in FFA resulted from the hydrolysis of phosphatidylcholine (PC), of phosphatidylethanolamine (PE), and to some extent of triglycerides. It is possible that the increased FFA levels could cause denaturation of the protein of the muscle. Decreases have been found in the PC and PE levels of chicken muscle stored at -10° C., with increases in lysophosphatidylcholine (LPC) and FFA. The various results suggest that lipid hydrolysis and protein denaturation were interdependent phenomena. In the present study, the authors examined changes in the phospholipid fraction of stored, frozen salmon muscle and attempted to relate the changes to specific hydrolysis of these lipids by lipolytic enzymes in the tissue.

Lake Michigan coho salmon were frozen and stored at -20° C. The various analyses were made on muscle samples of the fresh frozen fish and of the frozen fish stored for 6 and for 12 months. Analyses were made for the various fatty acids in the triglycerides; the total phospholipids; the phospholipid content of the fresh frozen and the frozen stored salmon; and the fatty acids in the various phospholipids of the frozen stored salmon.

The triglycerides and the phospholipids contained the same spectrum of fatty acids. The phospholipids contained slightly greater levels of C16:0, C18:0, and C18:1 and lesser levels of C16:1, C20:1, C18:2, and C20:5 fatty acids than did the (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO.11 PAGE 9

3.2493 CHANGES IN THE FLESH LIPIDS OF FISH DURING FROZEN STORAGE. PART II. FLESH LIPIDS OF SEVERAL SPECIES OF FISH

Takama, Kōzō, Kōichi Zama, and Hisanao Igarashi *Bulletin of the Faculty of Fisheries, Hokkaido University* **22**, No. 4, 290-300 (Feb. 1972) (In Japanese; figures, tables, and abstract in English)

The minced flesh of five species of fish (Alaska pollock, flying squid, northern blenny, yellowtail, and mackerel) was stored at -20° C. for 100 to 120 days; samples were withdrawn from storage at periodic intervals for analysis. Analyses were made for total lipids, phospholipids, neutral lipids, and free fatty acids. The rates of production of free fatty acid in the minced fish were about as follows: Alaska pollock, 12.0 μM/day/100 g. up to 40 days of storage, then it rose to a level of about 450 μM/100 g. of minced fish; mackerel, 8.0 μM/day/100 g.; yellowtail, 3.1; northern blenny, 2.0; and flying squid, 2.0. Lipid degradation was attributed to hydrolysis and oxidative reactions.

[3 figures, 3 tables, 12 references]

FTP

Vorob'eva, T. M., and E. Yu. Sukhanova (U.S.S.R.) *Chemical Abstracts* **76**, No. 25, 152159c (June 19, 1972)

EFFECT OF LONG-TERM PRESERVATION ON BALTIC SEA COD MUSCLE LIPIDS

3.2493

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO.11 PAGE 9

3.331 EFFECT OF PRE- AND POST-MORTEM HANDLING ON REFLECTANCE CHARACTERISTICS OF CANNED SKIPJACK TUNA (2.3)

Little, A. C. (Department of Nutritional Sciences, University of California, Berkeley, CA 94720) *Journal of Food Science* **37**, No. 3, 502 (May-June 1972)

This work is a continuation of a study of the effects of controlled pre- and postmortem handling of skipjack tuna on the quality of the canned product. It involved measurement of the reflectance characteristics of canned samples from fish subjected to 34 combinations of controlled handling conditions. In earlier reports, the author indicated (1) that CIE-Y values correlated directly with visual color scores and (2) that the magnitude of the chromaticity shift ( $\Delta x$ ,  $\Delta y$ ) on reduction with sodium dithionite was a measure of the relative concentration of denatured globin hemochrome.

Results of data on Y values alone revealed that none of the handling practices prior to canning [see L. Crawford, E. F. Irwin, J. Spinelli, and W. D. Brown, *J. Food Sci.* **35**, 849 (1970)] was sufficiently severe to affect systematically and significantly the reflectance values of the canned tuna. Differences, then, are probably due to individual variation.

Data on the magnitude of chromaticity shift ( $\Delta x$ ,  $\Delta y$ ) on reduction with sodium dithionite showed a systematic decrease in magnitude of chromaticity shift, particularly in  $\Delta x$ , on increasing holding temperature and finally on increasing time at the highest temperature to which the fish were subjected. The following table shows the mean values for Y,  $\Delta x$ , and  $\Delta y$  for all fish subjected to the same postmortem holding conditions.

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO.11 PAGE 9

4.20 TWO-STEP HOMOGENEOUS CONJUGATION AND HYDROGENATION OF METHYL ESTERS OF UNSATURATED FATTY ACIDS (6.137)

Ben-et, G., A. Dolev, M. Schimmel, and R. Stern (Centre for Industrial Research, The National Council for Research and Development, Ltd., Food Institute, Haifa, Israel) *Journal of the American Oil Chemists' Society* **49**, No. 4, 205-207 (April 1972)

In an overall study, the authors propose to conjugate linolenic acid selectively without conjugating linoleic acid, and then to hydrogenate the conjugated acid selectively under mild conditions. The keeping quality of various oils seems to be associated with their linolenic acid content. The linoleic acid content of certain oils may be desirable nutritionally because it is an essential fatty acid. Therefore, it would be desirable to selectively eliminate linolenic acid from certain food oils (soybean). The present paper reports on the conjugation of linoleate-linolenate methyl esters by potassium t-butoxide and the hydrogenation of methyl esters of conjugated fatty acids by phenanthrene chromium tricarbonyl complexes. The activity and selectivity of t-butoxide were tested at various concentrations, at different molar ratios of catalyst to oil, and in various solvents. The activity of phenanthrene chromium tricarbonyl was tested at various concentrations, at various temperatures, and in various solvents. The study indicated that a two-step (conjugation/hydrogenation) approach to selective reduction of unsaturated oils might be effective. Further work is being carried out in the search for more active and selective conjugation and hydrogenation catalysts.

FTP

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO.11 PAGE 9



## 3.6 FREEZE-DRIED PRODUCTS

FMC Corp. (pat.)  
British Patent 1,273,298  
Refrigeration and Air Conditioning 75, No. 891, 89 (June 1972)

The freeze-dried particles are placed in a chamber which is then evacuated. An inert gas is introduced into the chamber, and an edible coating is sprayed onto the product to cover and seal the particles together with gas filled voids. SW

FTF Pieces of fish are steeped in aqueous ammonia containing hydrogen peroxide in order to separate the fibers, and then the material is air dried.

[Patentee was not indicated]  
Japanese Patent 2533/72  
Food Technology 26, No. 6, 76 (June 1972)

## FISH DEHYDRATION

3.63

triglycerides. After the salmon were stored for 1 yr. at  $-20^{\circ}\text{C}.$ , the difference between the fatty acid levels in the triglycerides and the phospholipids was greater; there were lesser amounts of C14:0, C16:0, C18:0, C18:1, and C22:6 and greater levels of C12:0, C20:3, C20:5, C22:4, C22:5, C22:6, and C22:6 fatty acids remaining phospholipid fraction. The C20:4, C20:5, and C22:6 fatty acids are more concentrated in the phospholipids remaining after 1 yr. of storage of the fish at  $-20^{\circ}\text{C}.$ , while the C16:0 and C18:1 fatty acids are less concentrated. These changes are due to losses of specific fatty acids from the phospholipid fractions through enzymatic hydrolysis, or oxidative reactions, or both.

There was a decrease in the total phospholipid content in the frozen salmon stored for 6 months at  $-20^{\circ}\text{C}.$ ; significant decreases occurred in PC and LPC content. There were increases in the LPE (lysophosphatidylethanolamine) fraction and an unidentified phosphorus-containing fraction. These changes were caused by hydrolysis and oxidative reactions. Also, the increased amount of LPE might be due to the release of specific fatty acids (during hydrolysis) that may inhibit enzymatic activity resulting in incomplete hydrolysis and buildup of the LPE.

The data implied a preferential hydrolysis of PE containing C18:0, C18:1, and C22:6 fatty acids. The C16:0 and C22:6 acids were greatly concentrated and the C18:1 acid was much less concentrated in the remaining LPE; this fact is evidence for a slower rate of hydrolysis of PE molecules containing C18:0, C18:1, and C22:6 fatty acids.

It appears that the C16:0 and C18:1 fatty acids at the  $\beta$ -position of the PE by silylation played a role in the preferential hydrolysis of the PE by phospholipidase during frozen storage.

The authors showed that chemical changes in the phospholipid fraction of salmon occur during freezing and thawing. The authors further by the authors. [references 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100]

## 4.22 HETEROGENEOUS HYDROGENATION OF FISH OILS: KINETIC DETERMINATION OF CATALYST POISONING (6.137)

Mørk, P. C. (Department of Industrial Chemistry, Norwegian Institute of Technology, University of Trondheim, Trondheim N-7034, Norway)  
Journal of the American Oil Chemists' Society 49, No. 7, 426-432 (July 1972)

Results of work on the effect of operating variables on hydrogenation rate, mechanism, and selectivity for vegetable oils have been published but no such information is available for fish oils. In the course of work on the effect of experimental variables on the rates and products of the hydrogenation of mackerel oil, the authors found that the kinetics of the reaction were influenced strongly by catalyst poisons. This paper reports on the kinetic determination of catalyst poisoning during the hydrogenation of fish oil. Refined and bleached mackerel oil was hydrogenated with Nysel Ni catalyst at  $170^{\circ}\text{C}.$  at atmospheric pressure.

A plot of the differential rates of hydrogenation (iodine value units per min.) as a function of the iodine value showed a strong decrease in the rate during the first few minutes of hydrogenation, followed by a somewhat sharp bend in the rate curves around iodine values of 140. Apparently, severe poisoning of the catalyst takes place. Further tests in which the catalyst was added during the run as well as with prehydrogenation of the oil to various iodine values revealed three kinetically distinguishable poisoning effects. The first effect was a rapid one probably due to the presence of sulfur compounds. The second strong primary poisoning was completed within the first few minutes after hydrogenation. Finally, the third comparatively secondary poisoning reached a state of equilibrium after 25-30 min. of hydrogenation. Capelin oil showed similar results to mackerel oil. Also, the same poisoning effects were obtained with other catalysts (Girdler G-70B, Germania P, and formate catalyst KE/FR II). No poisoning effects were found when using soybean oil. [7 figures, 1 table, 18 references]

FTF

(3.2) 1363

Effect of holding temperature and time of skipjack tuna on Y value and chromatocity shift of the canned samples

Holding temperature and time of skipjack tuna	Reflectance values for the canned product		
	Y	$\Delta x$	$\Delta y$
Controls	22.7	0.5	4.6
32° F. for 6 hr.	29.2	0.4	6.3
32° F. for 6 hr.	28.0	0.3	10.1
32° F. for 6 hr.	28.2	0.2	9.5
32° F. for 9 hr.	27.2	0.1	8.7

The x-chromatocity coordinate is a measure of "red" reflectance. A decrease in the  $\Delta y$  value, then, probably signifies a decrease in the formation of the bright red ferro-hemochrome. The author suggests that postmortem denaturation of myoglobin inhibits conversion to hemochrome (the pigment responsible for the typical color of canned tuna).

[1 table, 5 references]

FTF

Lopez-Benito, Manuel (Inst. Invest. Pesq., Vigo, Spain)  
Chemical Abstracts 76, No. 25, 152223g (June 19, 1972)

USE OF CAUSTIC SODA TO TREAT MACKEREL, HORSE MACKEREL, AND SARDINE BEFORE CANNING

3.33 (2.3)





a laboratory spray drier. The temperature at the inlet was  $280 \pm 5^\circ \text{F.}$  ( $138 \pm 3^\circ \text{C.}$ ) and the outlet,  $190 \pm 5^\circ \text{F.}$  ( $88 \pm 3^\circ \text{C.}$ ).

The color of the samples was examined with a color meter. Sensory tests (appearance, texture, and flavor) were made of cookies prepared from the test samples. The samples were analyzed for total amino acids, and for their nutritive values by rat-feeding studies.

The color of FPC and of products (paste and cookies) prepared from FPC can be improved by treating the FPC with hydrogen peroxide. The optimum level of hydrogen peroxide was 0.6%; at this level there was no decrease in the nutritive quality of the product. Higher levels of hydrogen peroxide (1.25, 2.5, and 5.0%) resulted in further improved color of the FPC but the nutritive quality was reduced slightly. The reduction in quality of the FPC treated with higher levels of hydrogen peroxide may have been due to destruction of some methionine and cystine.

gen peroxide may have been due to degradation of some acrylonitrile and of some FTP [4 tables, 18 references]

Chemical Abstracts 76, No. 23, 139219r (June 5, 1972)

McPhee, Archie D., David L. Dubrow, and Lloyd O. Henderson (College Park Fish Prod. Technol. Lab., Natl. Mar. Fish. Serv., College Park, Md.)

# TERNARY EQUILIBRIUM DATA FOR PRODUCTION OF FISH PROTEIN CONCENTRATE (FPC)

6.54

6.51 (9.16)(9.14)

feeding frequency can be scheduled according to the rate at which the stomach content is depleted, i.e., the amount of available stomach capacity. Although little data are available there is good reason to believe that lipid concentrations in excess of 15 percent of the dry weight do have an inhibitory effect on gastric motility.

The range of lipid concentrations normally found in commercially prepared dry pelleted feed is not an important factor when considering rates of passage through the alimentary canal. Since lipid concentrations which can be incorporated in dry pelleted feed are limited by the mechanics of the pelleting process, nutritionists and manufacturers need add only that amount necessary for adequate growth. [1 figure, 2 tables, 6 references]

## Extracted

growth. [1 figure, 2 tables, 6 references]

Velarde, E. (Lab. Quím., Pontif. Univ. Catol. Peru, Lima, Peru) *Chemical Abstracts* 76, No. 25, 152249v (June 19, 1972)

# DETERMINATION OF THE NUTRITIVE VALUE OF THE PROTEIN OF FISH FLOUR

6.54

Current research into the production of protein from Spirulina, Scenedesmus and Fusarium is described. L.P. Reprinted

Current research into the production of protein from Spirulina,  
Scenedesmus and Fusarium is described. L.P. Reprinted

is a basic 1000, 9 tables, 9 references]

Data are given on the amino-acid and protein composition of the algae *Ulva lactuca* L., *U. linza* L., and *Durvillaea antarctica* (Cham.) Hariot, *Lessonia nigrescens* Bory, and *Porphyra columbina* Mont. The amino-acid and protein composition among these species of algae did not differ greatly. The low content of these amino acids (3.6 to 12% of the dry weight) seems to limit the value of these algae as a basic food.

Quilhot, Wanda P. (Department of Biology, University of Chile, Valparaíso, Chile)  
 Revista de Biología Marina 14, No. 2, 55-61 (Nov. 1970) (In Spanish; summary in English) (Department of Oceanology, University of Chile, Valparaíso, Chile)

6.37  
(6.54) (0.6)

6.31

#### 4.5 AUTOXIDATION OF SODIUM LINOLEATE IN THE PROTEIN SOLUTION

Yukami, Susumu (Research Laboratory, The Lion Dentifrice Co., Ltd.)  
Agricultural and Biological Chemistry **36**, No. 5, 871-874 (May 1972)

In the autoxidation of linoleate in protein (BSA) solution, the oxygen uptake varied with the concentration of the protein in the mixture. At protein levels of 0.05% and 0.17%, oxygen uptake was greatly reduced; at the protein level of about 0.5%, oxygen uptake was greatly increased; and at protein levels of 1% and greater, the oxygen uptake increased, but the increase was progressively less as the protein level increased above 1% (the protein levels tested were 0.05, 0.17, 0.35, 0.58, 1.73, 2.59, and 3.45%). Oxygen uptake of linoleate in the presence of enzyme (soybean lipoxidase) was similarly influenced by the level of protein in the mixture. On the basis of observations of the energy of activation rates for BSA and ovalbumin or gamma-globulin, the author believes that the catalytic action of BSA is similar to autocatalysis rather than to enzyme biocatalysis. . . . (6 figures, 2 tables, 15 references) FTP

FTP



A PRECISE METHOD FOR THE DETERMINATION OF DIMETHYL SULFIDE  
IN PROCESSED FOODS

Williams, Marion P., Johan E. Hoff, and Philip E. Nelson (Department of Horticulture, Purdue University, Lafayette, IN 47907)  
Journal of Food Science 37, No. 3, 408-410 (May-June 1972)

Dimethyl sulfide (DMS) is a degradation product of an S-methyl-methionine sulfonium salt. It appears in and contributes to the flavor and aroma of certain foods. Because DMS has a very low flavor threshold value (around 0.33 to 12 p.p.b. in water), it may be that the level of DMS in foods can be important in consumer acceptance. For example, earlier work has shown that a DMS level of from 0.5 to 2 p.p.m. in tomato juice produces the most desirable aroma quality.

The optimum level of DMS in food products can be achieved by selecting the proper processing conditions or by appropriate blending of raw material or finished product. To perform this kind of product quality control requires the availability of a rapid, accurate method for determining DMS. Present methods do not offer the required speed and precision. The authors, therefore, developed a suitable quality control method by adapting and modifying the procedure described by C. McAuliffe ["GC determination of solutes by multiple base equilibration," *Chem. Technol.* 1, 46 (1971)] for the determination of low levels of hydrocarbons in aqueous solutions. Twenty-five ml. of product liquid and helium gas are equilibrated in a 50-ml. hypodermic syringe. The gaseous phase is analyzed for DMS by gas chromatography. The system in the syringe adheres to Henry's law (there exists a proportionality between the concentrations of DMS in the gas phase and in the liquid phase) and Henry's constant is essentially identical for all processed food samples. When five replicate samples from each of three processed foods containing

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(over)

## CHROMATOGRAPHIC ANALYSES OF VOLATILE AMINES IN MARINE FISH

Gruger, Edward H., Jr. (Northwest Fisheries Center, National Marine Fisheries Service, NOAA, 2725 Montlake Blvd. East, Seattle, WA 98102)  
Journal of Agricultural and Food Chemistry 20, No. 4, 781-785 (July-Aug. 1972)

Amines in fish arise from bacterial action, enzymic reactions, and nonenzymic chemical reactions; the content of amines in fish varies with the species and age of the fish, and the handling and storage conditions. The level and variety of amines in fish (and other food products) is important relative to nitrite-treated products because of the reported involvement of the amines as potential precursors of carcinogenic nitrosamines. This article reports on the development of procedures for analysis of volatile amines in fish.

The amines were extracted from the flesh of sablefish, coho salmon, and salmon roe. The mixture of amines were analyzed by gas chromatography and by thin-layer chromatography-spectrophotofluorometry of the corresponding 5-dimethylamino-1-naphthalenesulfonamides.

The data, though limited, indicate that the amine patterns of the fish and salmon roe tested were relatively uncomplicated. The methylamines and diethylamine were the only ones that were confirmed for samples at levels above the level of detection of 7 ng./g. of wet tissue.

Salmon flesh showed from < 0.007 to 1.4 µg. of methylamine per gram of tissue, from 1.1 to 6.6 µg. dimethylamine per gram of tissue, from < 0.007 to 0.24 µg. diethylamine per gram of tissue, and from 3.6 to 6.6 µg. of trimethylamine per gram of tissue.

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## MINERAL COMPOSITION OF OREGON PELLET PRODUCTION FORMULATIONS

Crawford, David L., and Duncan K. Law (Department of Food Science and Technology, Seafoods Laboratory, Oregon State University, Astoria, OR 97103)  
Progressive Fish-Culturist 34, No. 3, 126-130 (July 1972)

Oregon pellets have been used for feeding salmon on a production scale basis since 1959. Use of this formulation is supported by over 10 years of research by the Oregon Fish Commission and Oregon State University. As a production formulation in wide use it has yielded good results with salmon raised under a variety of conditions including temperature extremes. The purpose of this investigation was to develop quantitative information on the mineral composition of Oregon pellet formulations and to evaluate the effect of formulation composition variations.

Four tables are presented: the first gives the composition of two Oregon pellet formulations (see the table that follows); the second gives the mean proximate composition of the two Oregon pellet production formulations; the third gives the mean mineral composition of the two Oregon pellet production formulations containing different wet fish components; and the fourth gives the mean mineral composition of the two Oregon pellet formulations.

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 11 PAGE 13

ISOVALERIC ACID IN ACOUSTIC TISSUES OF PORPOISES:  
TRIACYLGLYCEROLS RESISTANT TO PORCINE PANCREATIC LIPASE

Malins, Donald C., and Usha Varanasi (National Marine Fisheries Service, NOAA, Northwest Fisheries Center, 2725 Montlake Blvd. East, Seattle, WA 98102)  
Protides of the Biological Fluids. Published by Pergamon Press, Oxford and New York (n.d.), pp. 127-129. H. Peeters (Editor) (This note is Contribution No. 77 of the Oceanic Institute, Oahu, Hawaii)

Large amounts of isovaleric acid (a catabolite of L-leucine) and high levels of long-chain iso structures are found in the melon and mandibular canal (acoustic tissues) of porpoises. The blubber tissue (which has no acoustic function) contains much lower amounts of isovaleric acid and long chain iso acids. This study reports on an examination of the composition of the melon (acoustic) tissue of the porpoise (*Tursiops gilli*). The melon triacylglycerols were hydrolyzed by porcine pancreatic lipase and the reaction products were chromatographed on thin layers of silica gel at 2° C. in hexane:diethyl ether (80:20, v/v).

The melon triacylglycerols were strongly resistant to lipase hydrolysis (60.7 wt. % of the melon triacylglycerols were resistant to porcine pancreatic lipase). This resistance to lipase hydrolysis appears to be related to the presence of branched chains in the triacylglycerols; branched structures would sterically hinder the formation of the activated complex between the enzyme and the ester linkage. Data are given in the table.

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द्वि

[4 tables, 13 references]

Cottonseed meal	7	15.0
Herring meal	22.0	28.0
Shrimp (or crab) meal	4.0	4.0
Wheat germ meal	3.0	4.0
Corn distiller's dried solubles	3.0	4.0
Dried whey-products	--	5.0
Vitamin mixture	1.5	1.7
Wet fish	40.0	30.0
Kelp meal	2.0	2.0
Soybean oil-antioxidant	2.0	5.8
Choline chloride	0.5	0.5

### Composition of Oregon pellet formulations for feeding salmon on a production scale basis

8.42 (6.51)

PLP

[1 figure, 2 tables, 8 references]

Acid	Porpoise melon triacylglycerols	Lipase resistant fraction of the triacylglycerols
	mole %	mole %
5:0 (iso)	50.5	64.9
7:0	1.0	<0.5
9:0	<0.5	<0.5
11:0 (iso)	0.7	<0.5
11:0	<0.5	<0.5
12:0 (iso)	<0.5	<0.5
12:0	<0.5	<0.5
13:0 (iso)	1.5	<0.5
13:0	<0.5	1.0
14:0 (iso)	3.1	<0.5
14:0	4.1	2.7
14:1	1.9	3.3
15:0 (iso)	13.0	<0.5
15:0	1.0	14.3
16:0 (iso)	2.3	<0.5
16:0	3.9	1.9
16:1	6.7	2.5
17:0	<0.5	4.6
17:1	<0.5	--
18:0	<0.5	--
18:1	4.0	<0.5
unknown	3.0	2.0
		1.0

8.53 (0.35)

7.59 A STUDY OF THE METHODOLOGY FOR ASSAYING UNIDENTIFIED GROWTH FACTOR IN FISH MEAL AND FISH SOLUBLES

Miller, David, and Joseph H. Soares, Jr. (College Park Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, College Park, MD 20740)  
Poultry Science 51, No. 4, 1288-1291 (July 1972)

Four experiments were carried out, using a crystalline amino acid diet, to develop an improved bioassay for evaluating the unidentified growth factor(s) (UGF) in fishery products. Dietary adjustments were made to equalize the content of selenium (Se), fish oil, and of each amino acid based on the chemical analyses of the test materials. The existence of the UGF was demonstrated in the presence of an intact protein (5% gelatin), and constant total levels of proline (0.82%), Se (0.5 p.p.m.), and fish oil (1%). The UGF response from fishery products appears to be independent of the intestinal flora of the chicks and is derived from an unknown nutrient in the fishery products.

[6 tables, 6 references]

FTF

FTIP

III

mean DMS levels of 3.0, 6.1, and 15.1 p.p.m. were analyzed, the standard errors were -0.10, -0.24, and -0.29 p.p.m., respectively. The DMS content in parts per million of certain processed (canned) foods is as follows (each value represents analysis of one can): vegetable juice, 1.6, 2.1, 2.2; kraut juice, 2.4, 3.2, 3.8; peas, 4.9, 5.0, 5.1; tomato juice, 5.9, 6.4, 7.4, 10.2; yellow corn, 10.1, 11.6, 12.2, 16.0; and beets, 14.1, 27.9, 43.6.

7.599

7.42  
(9.19)

DETERMINATION OF MERCURY IN FOODS, INDUSTRIAL EFFLUENTS AND DRINKING WATER BY MEANS OF FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETRY

Cavallaro, A., and G. Eli  
Boll. Lab. Chim. Prov., 22, No. 2, 168-179 (1971) (In Italian)  
BFMIRA Abstracts 25, No. 6, Abstract No. 1962, 397 (June 1972).

A procedure is described by which down to 0.01 p.p.m. of mercury in foods and 0.005 p.p.m. in drinking water and effluents can be determined. G. C. Reprinted

FTD

Salmon roe showed 0.58 to 1.2  $\mu\text{g./g.}$  of wet tissue of methylamine, 3.1 to 4.1  $\mu\text{g./g.}$  of dimethylamine, 5.7 to 7.9  $\mu\text{g./g.}$  of trimethylamine.

[5 tables, 28 references]

FTP

The sablefish showed no dimethylamine and  $< 1 \mu\text{g.}$  of diethylamine per gram of wet tissue. A sample of the sablefish stored in aluminum foil at  $6 \pm 1^\circ \text{C.}$  for 28 days, showed eightfold as much trimethylamine and one-seventh as much methylamine as did the good unstored flesh. The stored sablefish, also, showed no dimethylamine.



Feeley, Ruth M., Patricia E. Criner, and Bernice K. Watt (Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Md.)  
Journal of the American Dietetic Association 61, No. 2, 134-149 (Aug. 1972)

Studies were performed to update and expand the values of cholesterol content in foods in table 4 of Agriculture Handbook No. 8, *Composition of Foods—Raw, Processed, Prepared*. Sources that were the basis of values shown in that table were reexamined and modified or replaced by additional information published through 1971, and by new, unpublished research. As a result of this study, values that are considered the most suitable for estimating cholesterol in foods were compiled in a table to aid in calculating diets.

Principal sources of cholesterol in the American diet are meats, poultry, fish, shellfish, eggs, and dairy products. Several items from each of these categories were listed in the table. Data for cholesterol content were provided on three bases: specified household measure; 100-g. edible portion; and edible part from 1 lb. food as described.

Cholesterol is one of the cyclic alcohols called sterols. It is synthesized by the body and functions in normal metabolism. It is also supplied in foods of animal origin only. Cholesterol content of foods has been mistakenly related to fat content; the assumption was that removal of fat would result in a corresponding decrease in cholesterol. A comparison of data in the table shows that lower fat content in related foods is not accompanied by lower cholesterol content.

(over)

Walsh, John J. (Department of Oceanography, University of Washington, Seattle, WA 98105)  
Science 176, No. 4038, 969-975 (June 2, 1972)

As far back as 40 years ago, W. C. Ailee [Ecol. Monogr. 4, 541 (1934)] suggested the study of total marine ecosystems. Our environmental problems are greater now than they were in 1933, but use of the systems approach to solve these problems has had to await the development of adequate technology, including the interest in such an approach to oceanography. Use of digital computers has made possible complex models of multiple population interaction, fishery management, and nutrient flow within several trophic levels. The author suggests that the ability to simulate has perhaps caught up with the ability to measure total ecosystems.

Because the intertidal regions are easily accessible, it has been well described, and energy budgets have been prepared for mangrove forests, salt marshes, and rocky coasts. The distribution of marine benthic communities and individual pelagic communities has been studied. But, little work has been addressed to studies of total marine ecosystems on a scale comparable to studies of the terrestrial biomes of grassland, tundra, desert, deciduous forest, coniferous forest, and tropical forest. Some effort has been made to develop simulation models as part of a systems approach to upwelling systems [J. J. Walsh, J. C. Kelley, R. C. Dugdale and B. W. Frost Invest. Pesq. 35, 25 (1971)]. Such studies led to the question of whether or not the ecosystem of these coastal upwelling areas constitute collectively a marine biome.

(over)

Tyler, A. V. (Fisheries Research Board of Canada, Biological Station, St. Andrews, New Brunswick, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 7, 997-1003 (July 1972)

Earlier work indicated that fresh-water fishes in communities have overlapping feeding niches when food resources are superabundant but the niches are rather discrete when abundances of food are reduced. The present study examined the food-resource partitioning among marine fish species in an area of Passamaquoddy Bay, New Brunswick, Canada. The division of food resources among 13 species of demersal fishes was studied over a 16-month period. Over 100 prey species were found in the stomachs of the predators; however, each predator took only three or four principal prey. The species taken as principal prey by the predators depended upon the body size of the prey, upon whether the prey were nekton, epi-fauna, or in-fauna, and upon whether the prey had a hard test or shell. Generally, the smaller predators ate the smaller prey. The seasonal predators, as a group, did not feed on their own set of prey species.

[5 figures, 28 references]

Chemical Abstracts 76, No. 25, 152354a (June 19, 1972)

Def. Publ. U.S. Patent Off. 896,037 (Mar. 21, 1972)

Wright, Donald L. (pat.)

9.11

The systems approach used in the International Biological Program studies of upwelling ecosystems involves the interaction of environmental data, experimental work, data analyses, and simulation models. The adoption of the systems approach is a new way to view and to do oceanography. Recent studies (field and theoretical) on upwelling systems reveal the need for experimental oceanography based on computers capable of rapid data analysis and on simulation modeling aboard ship and ashore. The computing system aboard ship must be capable of acquiring data in real time, of data editing of underway and batch input, of graphic display of historical data, of presentation of ongoing laboratory experiments aboard ship, and of running simulation models. The systems oceanographer must be able to plan tactical responses to temporal and spatial variations of upwelling ecosystems. This ability to view the ocean on the spot, rather than a year later, is essential to a systems approach.

Most of the environmental problems occur at the systems level of complexity. If models are used as one of the necessary tools of studies of marine ecosystems, and if these models and their individual components are tested in the field, families of systems may eventually be used as models as a guide to an understanding of the dynamics, and to the prediction and management of perturbations of marine coastal areas.

[3 figures, 1 table, 101 references]

FTP

8.59 8 (11)(0.0)(0.7)

Meats of all kinds contain cholesterol. It is present in lean muscle, cell membrane structures, and fatty tissues; it occurs in higher concentrations in organs and glandular meats than in regular cuts of meat, with or without fat, with highest concentrations in brains. The amount of cholesterol is about the same in marbled and nonmarbled meat.

Egg yolk is one of the most concentrated sources of cholesterol in the diet; egg white has none. Some cholesterol is present in noodles because of the legal requirement for egg solids.

Cholesterol content for poultry, fish, shellfish, and dairy products was also listed. Data are listed for the following fish and shellfish and certain of their prepared products: sturgeon caviar, salmon roe, clams, crab, lobster, oysters, scallops, shrimp, frog legs, cod, flounder, haddock, halibut, herring, mackerel, salmon, sardines, trout, and tuna. In addition, scattered data were reported for bass, carp, perch, pike, pollock, sole, and whiting.

[1 table, 45 references]

SW

8.53 POSSIBLE EXPLANATION FOR THE DIFFERENCES IN THE FATY ACID COMPOSITION OF FRESH-WATER AND MARINE FISHES

Farkas, Tibor (Biol. Res. Inst., Hung. Acad. Sci., Tihany, Hungary)  
Chemical Abstracts 76, No. 13, 70366s (Mar. 27, 1972)

9.15

# INCIDENCE OF EPIDERMAL LESIONS IN FISH OF THE NORTH-EAST IRISH SEA AREA, 1971

Perkins, E. J., J. R. S. Gilchrist, and O. J. Abbott (University of Strathclyde, Marine Laboratory, Garelochhead, Dunbartonshire, Scotland)  
Nature 238, No. 5359, 101-103 (July 14, 1972)

In March 1971, the authors and the fishermen noted a high incidence of epithelial lesions in plaice (*Pleuronectes platessa*) and dab (*Limanda limanda*) taken in the North-East Irish Sea. During the period 1959 through 1970 epithelial lesions in these fish did not occur to a significant degree. The lesions consisted of lymphocystis, epidermal ulcers, and fin damage. The symptoms were confined to plaice and dab that were of such size to have spent at least one winter in deep water and then to have entered the fishery in the North-East Irish Sea.

Although epidemics may occur periodically, the situation appeared abnormal because the three diseases occurred simultaneously in some 1,500 square miles of sea. The Irish Sea has been used as a dumping ground for toxic chemicals and has been the scene of a shipwreck in 1969. Some of the materials from these sources--such as the polychlorinated biphenyls--may possibly, in sublethal doses, render the exposed fish more susceptible to the onset and influence of disease. Because the disease was absent in young fish from the fishing area (and nursery grounds), it appears that the event that caused the diseased state occurred while the adult fish were in deeper water during the winter. The evidence is not sufficient, however, to indicate whether the present outbreak of the diseases is of bacterial origin or if the dumping of toxic wastes is responsible. The study is being continued and will be reported later.

[5 figures, 3 tables, 7 references]

FTP

9.11 (0.2)

## PARTIAL PRESSURE OF GASES DISSOLVED AT GREAT DEPTH

Fenn, Wallace O. (Department of Physiology, University of Rochester School of Medicine and Dentistry, Rochester, NY 14620)  
Science 176, No. 4038, 1011-1012 (June 2, 1972)

The author applied thermodynamic concepts to data showing that the solubilities of oxygen, carbon dioxide, and helium in water decrease with increasing pressure and depth. The calculations show that when water is saturated with a given gas at 1 atmosphere pressure absolute, the equilibrium partial pressure of the gas at any depth is equal to the partial pressure of that gas if it were contained in a gas column extending from the surface to that particular depth. The values for gases (He, O<sub>2</sub>, CO<sub>2</sub>) in water calculated for conditions at the surface and at a depth of 10 km. (assuming that both the concentration and partial pressure are affected by depth) are shown in the table that follows.

Gas	Partial pressure of gas		M/partial molal volume	Relative concentration of the gas		Partial pressure of gas in water at a depth of 10 km.
	At the surface of the water	At 10 km. depth of the water		At the surface of the water	At 10 km. depth of the water	
Helium	atm. 1.0	atm. 1.17	mole/ml. 4/29.7	1.0	0.35	atm. 1.4
Oxygen	1.0	3.55	32/32	1.0	1.0	4.0
Carbon dioxide	1.0	5.7	44/34.8	1.0	1.39	5.7

[2 figures, 1 table, 3 references]

FTP



Williams, Ernest H., Jr. (Department of Fisheries and Allied Aquaculture, Agricultural Experiment Station, Auburn University, Auburn, AL 36830)  
Alabama Marine Resources Bulletin, No. 8, 25-31 (June 1972) (Alabama Marine Resources Laboratory, Dauphin Island, AL 36528)

Under mariculture conditions fish parasites are an important problem. Fish that were captured for an experiment in mariculture techniques were examined for parasites. The fish were held in wire cages at stocking densities of 150 to 450 per cubic yard in a salinity range of 15 to 30 p.p.t. No massive mortalities occurred.

Twenty of each of the following species were studied. Pompano (*Trachinotus carolinus* Linnaeus), Atlantic croaker (*Micropogon undulatus* Linnaeus), spot (*Leiostomus xanthurus* Lacepede), gafftopsail catfish (*Bagre marinus* Mitchell), and sea catfish (*Arius felis* Linnaeus).

In pompano, the incidence of *Trichodina* species, monogenetic trematodes and cestodes increased after confinement. Digenetic trematodes, and *Scyphidia* species and *Trichodina* spp. infestations on the skin decreased. In Atlantic croaker, the numbers of monogenetic and digenetic trematodes and nematodes decreased during confinement while *Trichodina* increased. In gafftopsailfish, infestations of *Trichodina* spp. and *Scyphidia* spp. increased on the gills after confinement. On the skin, infestations of *Trichodina* and *Vorticella* spp. decreased. In sea catfish, numbers of monogenetic trematodes on the gills decreased. On the skin of the catfish, numbers of *Trichodina* decreased. In spot infestations of monogenetic trematodes, *Trichodina*, leeches, and encysted nematodes occurred on the gills.

Riley, John G., Richard J. Rowe, and Herbert Hidu (Department of Agricultural Engineering, University of Maine, Orono, ME 04473; and the Ira Darling Center for Research, Teaching and Service, University of Maine, Walpole, ME 04573)  
Commercial Fisheries Review 34, Nos. 5-6, 41-43 (May-June 1972)

The most significant development in oyster hatchery economics in recent years has been cultureless setting. Great efficiency is achieved in the juvenile phase by eliminating bulky cultch and oyster mortality due to crowding loss on cultch. However, the rearing of a free juvenile oyster to harvest has presented the industry with new problems. It may not be practical to place small free oysters directly on the bottom because of high loss due to siltation, movement by currents, and bottom-dwelling predators, especially blue crabs in the Chesapeake area. The tray-ling of cultureless oysters to harvest may present economic problems due to the handling necessary to alleviate crowding and to control fouling organisms.

An alternate approach is to rear cultureless oysters under controlled conditions to a size allowing efficient growth in the hatchery (approximately  $\frac{1}{4}$ ") and then reattach the oysters to a substrate for placement in the field to harvest. Such a method would permit the efficiency of the hatchery cultureless operation; at the same time, it would allow optimal spatial distribution of oysters later in the field. This may provide conditions for maximum growth and desirable shell dimensions.

(over)

Culley, Dudley D., Jr., and Samuel P. Meyers (Louisiana State University, Baton Rouge, LA 70803)  
Feedstuffs 44, No. 31, 26-27 (July 31, 1972)

Several million bullfrogs (*Rana pipiens*) and leopard frogs (*R. catesbeiana*) are used annually in the United States for teaching and research purposes. About 50% of these frogs are imported and the other 50% are collected from the wild, with an estimated loss of 80% due to disease and mishandling. Unless a successful method of aquaculture is developed a serious decline in the availability of frogs is predicted within 10 to 15 years.

There is a real need for sound amphibian aquaculture. Frogs can be important in research because of a virus-linked cancer found in them. Other amphibians, because of their capability to regenerate lost organs, are interesting relative to humans regenerating replacement of organs.

Outdoor attempts at frog aquaculture have failed due to disease, cannibalism, predation, and slow growth related to environmental temperature. Indoor culture under controlled conditions has been more successful.

Increased attention to genetics of frogs and development of laboratory defined strains will be necessary if they are to become a reliable research medium. Several companies raise frogs which are standardized for basic characteristics as age, geographic origin, nutrition, and rearing conditions. Aquaculture of frogs is handicapped because the nutritional requirements of tadpoles are not known, and also by the lack of an acceptable pellet-type feed. At 21° to 27° C., frog eggs (over)

Clingan, Thomas A., Jr. (University of Miami Sea Grant Decision Seminar, November 1971) (chairman)  
University of Miami Sea Grant Special Bulletin No. 5, 35 pp. (Jan. 1972). Available from the Information Services, Sea Grant Institutional Program, University of Miami, Box 9178, Miami, FL 33124. Price \$3.00.

A seminar was convened for the purpose of considering the policies that would cover seven problem areas in national and international fisheries management. The report covers goals, identifies trends, analyzes problems, and gives the conclusions of the seminar.

1. Fishery Resources and Their Exploitation: History. Present Trends and Projections.--The world catch of marine fish, in 1968, was 57 million metric tons (125.7 billion lb.). Stocks of flatfish, cods, and Atlantic redfish are exploited close to their potential. Stocks of tuna, sardines, jacks, anchovies, and hakes could be exploited more. Shrimp, salmon, and tuna constitute more than 50% of the total landed value of U.S. fisheries. The future demand in the United States will remain for high-quality, high-priced stocks, canned and frozen fish products, and industrial fish for oil and animal feeds.

2. Goals of Fishery Management and Regulation.--Neither maximum sustainable yield nor maximum economic yield, but a combination of the two plus social factors should establish a new fishery management goal called "Maximum Social Yield."

3. Methods of Regulation.--The first step in regulation is to determine the correct level of fishing that is required to achieve the desired level. The methods to regulate a fishery are control of fishing effort, restricting age and size of fish taken, and reduction of the number of fishing units.



Cultchless European oysters, *Ostrea edulis*, were artificially reattached to asbestos-cement boards. After 4 months' submersion, the oysters showed growth rates and morphology superior to those of nearby tray-grown stocks; they demonstrated natural reattachment to the panels.

More extensive work is now in progress to evaluate the system quantitatively on a long-term basis, to determine the optimum spatial arrangement of the oysters on the panels and of the panels themselves, and to compare growth rate and survival to those of conventional rearing methods.

[1 illustration, 5 references]

vice can be removed to an oyster growing area where the seed can mature to marketable size oysters. SW

U.S. Patent 3,675,626 (July 11, 1972)

Down, Russell J. (Holmes Landing Road, Cape May Court House, Cape May County, NJ 08203)

METHOD FOR GROWING OYSTERS

51.15

Parasites of marine fish are similar to those found in fresh-water fish. Two genera of protozoans associated with mortality in fresh-water fish culture are Scyphidia and Trichodina. Monogenetic trematodes are also a problem. Alimentary parasites such as digenetic trematodes, nematodes, and cestodes seldom cause problems. Additional research is needed to determine effective chemical treatment to control fish parasites in rackfish and salt water.

[6 tables, 4 references] SW

The article describes a compact recirculation system for rearing rainbow trout. In an 8-month-long experiment, 75 kg. of trout could be maintained in a healthy condition in a 1,600-liter tank, using a makeup water rate of 1.0 liter/min. (about one tank volume per day). The levels of temperature, oxygen, pH, ammonia nitrogen, and nitrate nitrogen were controlled satisfactorily. The unit costs about \$3,000. [3 figures, 14 references] ETP

Journal of the Fisheries Research Board of Canada 29, No. 7, 1071-1074 (July 1972)

Institute, Winnipeg, Manitoba R3T 2N6, Canada)

## 9.16 A CONTACT RECIRCULATION UNIT FOR THE REARING AND MAINTENANCE OF FISH

# USE OF A NARCOTIC MIXTURE DURING THE TRANSPORTATION

9.16

Strebkova, T. P. (Vses. Nauchno-Issled. Inst. Rybn. Khoz. Okeanogr., Moscow, U.S.S.R.)

Chemical Abstracts 76, No. 21, 121513x (May 22, 1972)

[6 references]

will develop into larval tadpoles in about 2 to 3 days. Growth of bullfrog tadpoles is rapid with adequate feeding; in about 3 months a 10-cm. tadpole enters the metamorphosis stage. Within 3 to 4 weeks they develop into the adult bullfrog morphology. During metamorphosis, tadpoles do not feed; at the end of this stage they weigh 50% less than at the start. Available commercial animal feeds disassociate in water. Other feeds cannot be grasped by tadpoles, and they also disintegrate in the water. Good growth in tadpoles was produced in tests of rabbit pellets, chicken feed, and trout chow, but the feeds did not have good water resistance characteristics. Using these basic feed formulae (ground to pass through a 1.0 mm. screen) studies were made of various binders. Alginate, pregelatinized starch, and gelatins were tried. It was determined that Knox gelatin was most effective in binding rabbit feed in the proportion of 4 g. of gelatin to 300 ml. of hot water, especially when the feed was added after the solution jellied. In addition, on this feed, growth of tadpoles was rapid and no adverse effects were seen. Preliminary work indicates that many commercial feeds can be bound into pellets using gelatin.

9.16 (9.14)

trial rights outside the 12-mile zone for coastal States.

7. International Organization and the Management and Regulation of Fisheries.--In the proposed 1973 Law of the Sea Conference, defense and fisheries interests will be influential. The U.S. fisheries objectives are to protect the coastal fisheries, create effective management schemes, and enhance the U.S. distant water fisheries. The U.S. objectives with respect to fisheries are to incorporate the 12-mile zone advocated by the Defense Department with certain prefer-

6. National Organization and the Management and Regulation of Fisheries.--A fishery lying within a State should be managed by that State. A fishery lying within two or more States should be regulated by a commission. A fishery harvested by domestic and foreign fishermen should be regulated by a commission. A fishery now regulated should not be disturbed.

5. Assistance and Technical Aid in Support of Fisheries Management.--Federal programs support operation and maintenance of vessels. Only operators of U.S. vessels fish in territorial waters and the contiguous zone of the United States and land fish at U.S. ports. Where a U.S. vessel is seized by [agents of] a foreign country, the Secretary of State will attempt to secure release of the vessel and reimburse the owner's fines. (More assistance should be given to improve markets, increase the quality control of fish products, and for incentives to increase safety.)

concerned to biological criteria. Zones on specific fish stocks should be established by coastal States with preferential right to a sustainable yield (SY). Principally affected foreign nations should receive an allocation of the SY.



9.19  
(9.2)

RESIDUALS CHARGES FOR POLLUTION CONTROL:  
A POLICY EVALUATION

Freeman, A. Myrick III (Bowdoin College, Brunswick, Me.), and Robert H. Haveman  
(University of Wisconsin, Madison, WI 53706)  
Science 177, No. 4046, 322-329 (July 28, 1972)

Card A

Failure of the existing pollution control strategies has led to examination of alternatives. There is growing interest in one alternative which would involve a significant departure from present policies; the strategy of creating economic incentives for pollution control by levying taxes or charges on residual wastes discharged to the environment. Five years ago, the residuals charge strategy was opposed by business, Government, and environmental groups. Now the President and his advisors, environmental groups, and members of Congress endorse the principle of residuals charges. Congress and several states are considering proposals that would raise the cost of discharging harmful wastes to the environment. In spite of growing acceptance of the concept of residuals charges criticism, based upon misconceptions and confusion, has appeared. This article seeks to clarify the issues.

The case for residuals charges rests on the acceptance of two primary propositions. First, in a market economy, prices play a major and valuable role in the allocation of resources to uses that will be of the highest value. Second, degradable environmental resources, unlike most other resources, are now outside the scope of the market system, and the uses to which they are put are not subject to the guidance of prices. Furthermore, the indicators to economic decision makers in the market system are the prices of goods and resources. In the case of environmental resources, the price indicators are absent. Land, labor, and, capital (over)

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9.19  
(9.2)

RESIDUALS CHARGES FOR POLLUTION CONTROL:  
A POLICY EVALUATION

Freeman, A. Myrick III (Bowdoin College, Brunswick, Me.), and Robert H. Haveman  
(University of Wisconsin, Madison, WI 53706)  
Science 177, No. 4046, 322-329 (July 28, 1972)

Card B

discharges and the price (or residuals charge) must be set high enough to ration this fixed supply among those who wish to make discharges. If an initial charge fails to attain the quality standard the charge should be raised until the standard is met.

A frequent criticism of this strategy is that it allows those with financial means to buy their way out of effective environmental control. The economic incentive to reduce the costs per unit of waste discharged is expected to discourage those who, in effect, would have to continually purchase the right to discharge wastes.

Critics from industry argue that residuals charges would cripple their ability to finance pollution control equipment. The purpose of a residuals charge strategy is to remove pollution control efforts from dependence on a notion of social responsibility. The economic incentives of the residuals charge will make continued discharges so costly that abatement investments will become profitable, and industry will find the financial resources to undertake these activities.

The practice of imposing sewer (or user) charges for services of municipal sewer systems is acceptable to those who argue that residuals charges are not acceptable because no service that entails cost is rendered. A service of value is indeed rendered to those who discharge wastes into a natural system; furthermore, (over)

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9.19  
(9.2)

RESIDUALS CHARGES FOR POLLUTION CONTROL:  
A POLICY EVALUATION

Freeman, A. Myrick III (Bowdoin College, Brunswick, Me.), and Robert H. Haveman  
(University of Wisconsin, Madison, WI 53706)  
Science 177, No. 4046, 322-329 (July 28, 1972)

Card C

water pollution control will be less than 1% of the value of shipments. Such costs would have a smaller impact than a 5% increase in wage costs. Reductions of air pollution would cost about the same amount.

Will those firms with market power escape the incentive effect of residuals charges by raising prices sufficiently to pass the full amount on to the consumer? In such an event pollution would be curbed by lower demand due to higher prices. However, the modern corporation seeks constantly to reduce costs of production; the economic incentive will remain as an influence. The effect of residuals charges on a public regulated utility is problematical; it may seek a rate increase rather than abatement of pollution to offset the charge. A proposed tax on sulfur dioxide emissions will affect users of fossil fuels, usually utilities. The authors believe that the tax, if it is keyed to air quality standards, will be more effective than direct regulation-enforcement of emission standards.

Another opinion, reported elsewhere, concluded that, with reference to water quality, residuals charges would make implementation of a comprehensive environmental management program more difficult. This conclusion is incorrect. Comprehensive plans of river basins must be the basis on which appropriate effluent

(over)

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9.19

DDT: INHIBITION OF SODIUM CHLORIDE TOLERANCE  
BY THE BLUE-GREEN ALGA ANACYSTIS NIDULANS

Batterton, J. C., G. M. Boush, and F. Matsumura (Department of Entomology, University of Wisconsin, Madison, WI 53706)  
Science 176, No. 4039, 1141-1142 (June 9, 1972)

The fresh-water blue-green alga Anacystis nidulans was able to grow in regular medium [C. Van Baalen, J. Phycol. 3, 154 (1967)] containing 1% NaCl and in regular medium containing 800 parts per billion of DDT [1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane], but growth of the organism was inhibited in the presence of both compounds. This inhibition of growth was reversed when the calcium content of the growth medium was increased (see the table that follows). The authors speculate that inhibition of (Na<sup>+</sup>, K<sup>+</sup>)-activated adenosine triphosphatase by DDT causes the A. nidulans to lose the ability to tolerate sodium chloride. The finding that the toxicity of DDT increases at high NaCl concentrations is important in view of the fact that blue-green algae are primary producers.

(over)

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9.19 (9.2)

this manner of waste disposal entails real social costs in the form of damaged recreation areas, injuries to health, and possible sacrificed longevity of residents. It is the existence of these costs, and the absence of any institutions for imposing them on those who use the environment for waste disposal which make pollution a problem for public policy. In addition, the laws recognize public ownership in common property resources. A residuals charge policy would assert that what the public has the right to give away through licenses it can also charge a price for.

Several observers have argued that because accurate monitoring of residual flows is not practical, a residuals charge is not a feasible alternative. Measurement technology is available at reasonable cost relative to control of the more significant and ubiquitous pollutants. Any pollution control strategy, to be effective, would require accurate and continuous measurement of discharges.

In the absence of complete knowledge concerning costs of waste discharge reduction, a regulation-enforcement system can achieve a quality standard, but at a cost which is likely to be substantially above the minimum obtainable. Under similar circumstances the residuals charge system would achieve pollution reduction at minimum cost, but with some trial and error charges, in order to find the exact charge at which the quality standard is attained.

Will residual charges through their impact on production costs raise prices and lead to inflation? Inflation is defined as a condition of continuously rising prices for all goods. A residuals charge would cause a one-time rise in the price of goods for which it is levied, but in the long run, since higher prices cause reductions in demand and corresponding reductions in pollution. It is estimated that if all industries undertake secondary waste treatment by 1974, the cost of

[Continued on Card C]

9.19 (9.2)

have prices, but public lands and watercourses, the atmosphere, have no price because no one owns them. These resources are then treated by everyone as free goods. When scarce resources are made available at zero prices, and with no non-market control of their use, they are over used.

There are two possible solutions to overuse of common property resources. One solution is the regulation-enforcement strategy; the other solution is to reproduce the effect of private markets by charging a price to those who would use the common property resource. The price would then allocate or ration the resource.

Under a system of residuals charges, the Government would be paid a price for each unit of waste discharged into a common resource. Dischargers are led to compare the cost of using the environment for waste discharge, as reflected to them by the residuals charge, with the cost of handling their waste disposal problem in another manner. The only guide is the relative costs of the different waste disposal procedures. Producers of wastes will reduce their discharges to the environment provided the marginal cost of waste treatment is less than the price or marginal cost of discharging wastes to the environment. In this manner environmental resources can be brought into the economic system with the same incentives that induce efficiency in the use of labor, capital, and land.

In the residual charge strategy the appropriate charge for a particular pollutant should equal the marginal or incremental damage caused by the pollutant measured in dollars. However, reliable information for assigning charges this is not available. A misconception regarding residual charges is the belief that such charges can be levied only if the government provides for a charge to be levied on the economic activity. This is not true. The Federal standards, in the economic terms the Federal standard establishes a charge for a pollutant

[Continued on Card B]

9.19

Culture of A. nidulans in Cg10 medium containing:

Culture of <u>A. nidulans</u> in:	Growth rate of <u>A. nidulans</u> in Cg10 medium containing:			
	25 mg. of Ca(NO <sub>3</sub> ) <sub>2</sub> per liter	+1% NaCl	No NaCl	125 mg. of Ca(NO <sub>3</sub> ) <sub>2</sub> per liter
Cg10 medium	2.01±0.12(a)	1.41±0.13(a)	No NaCl	1.89±0.08(b)
Cg10 medium +800 p.p.b. of DDT	1.95±0.10(a)	0.0(a)	No NaCl	1.53±0.10(a)

(a) Significant difference between NaCl-treated and untreated cultures at 99% confidence.

(b) No significant difference between NaCl-treated and untreated cultures.

[2 tables, 19 references]

FTP

METHODS FOR STUDYING THE EFFECT OF POLLUTION  
ON THE BIOLOGICAL PRODUCTIVITY OF BODIES OF SEA WATER

9.19

Kasymov, A. G. (Inst. Zool., Baku, U.S.S.R.)  
Chemical Abstracts 77, No. 4, 24590n (July 24, 1972)

(2.6) 61.6

charge scheduled are calculated; furthermore, if new collective facilities are revealed to be part of the least-cost plan, they should be financed and constructed on the basis of the comprehensive plan.

There have been repetitions of the statement that the residuals charges strategy would be too complex administratively to be workable. The authors state that this strategy would be simpler to administer and more effective than regulation because there will be less opportunity for powerful interests to gain special advantages through low visibility negotiations with a regulatory agency. The authors contend that the regulatory agencies (established by the Government to further the public interest) favor the interests of those being regulated.

The authors conclude that the current regulation-enforcement approach has failed due to its political and administrative difficulties. A new environmental strategy which minimizes reliance on regulation-enforcement and emphasizes the use of economic incentive to achieve changes in behavior seems desirable on political and theoretical grounds. They believe that limited and carefully prepared experiments with residuals charges should be undertaken to determine the viability of the approach.

[see references 46]

MS

PURIFICATION OF THE EFFLUENT WATER IN THE MEAT  
AND FISH INDUSTRY

9.19

Baldacci, Pier V., Armando Canuti, and Gilberto Coppiardi (Lab. Chlm. Prov. Cremona, Cremona, Italy)  
Chemical Abstracts 77, No. 4, 24501e (July 24, 1972)

[Continued on Card B]



9.19 HISTOLOGICAL CHANGES IN LOBSTERS (HOWARUS AMERICANUS)  
(1.87)  
EXPOSED TO YELLOW PHOSPHORUS

Aiken, D. E., and E. H. Byard (Fisheries Research Board of Canada Biological Station, St. Andrews, New Brunswick, Canada)  
Science 176, No. 4042, 1434-1435 (June 30, 1972)

An industrial discharge of yellow phosphorus killed fish and crustaceans in Long Harbor, Newfoundland. Studies were performed to determine the toxic effects of yellow phosphorus on lobsters.

Juvenile lobsters were held in tanks of aerated sea water containing various concentrations of phosphorus-contaminated mud obtained from the polluted site in Long Harbor.

Tissues were removed from 16 moribund lobsters and 2 controls that were killed by asphyxiation in oxygen-free sea water. A second control group was quickly killed.

Of the lobsters exposed to the lethal phosphorus suspensions, only the antennal gland and the hepatopancreas showed signs of degeneration. None of the controls had any signs of degenerative changes. Lobsters suffering from lethal exposure to yellow phosphorus die in a way that is characteristic of asphyxiation.

In addition, blood in the cardiogastric region becomes thick; coagulation continues until the thorax is filled with gelled blood. The authors suggest that phosphorus activates the hemolymph clotting mechanism of the lobster which causes asphyxiation.

The clot initiating factor is an intracellular calcium-dependent transglutaminase which is released from ruptured hemocytes by exposure to yellow phosphorus (over)

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9.19 MERCURY IN MARINE ORGANISMS OF THE TAY REGION  
(9.15)

Jones, A. M., Yvonne Jones, and W. D. P. Stewart (Department of Biological Sciences, University of Dundee, Dundee, Scotland)  
Nature 238, No. 5360, 164-165 (July 21, 1972)

[The River Tay empties into the Firth of Tay at the city of Perth in northern Scotland. The Firth of Tay, an arm of the North Sea, is about 30 miles long. The town of Broughty Ferry is on the north shore of the Firth of Tay and inland of the point where it joins the North Sea. Arbroath is a coastal town on the North Sea, and is about 10 miles north of the Firth of Tay. The city of Dundee is situated on the north shore of the Firth of Tay a few miles west of Broughty Ferry. Abstractor's note]

Mercury concentrations were investigated in marine algae and molluscs which were collected from the littoral zone at Broughty Ferry (an estuarine environment), and from a coastal area north of Arbroath.

Mercury was determined by flameless atomic absorption spectrophotometry. The results were expressed on a wet weight and on a dry weight basis. High levels of mercury were found in the algae (0.319 to 25.537 µg. Hg g.<sup>-1</sup>, dry weight) and molluscs (0.112 to 2.112 µg. Hg g.<sup>-1</sup>, dry weight) collected near Broughty Ferry. No mercury was found in the organisms collected on the coast north of Arbroath. That mercury was present in appreciable levels at several trophic levels in the Tay estuary is shown by the concentrations found in three feeding types of molluscs: a suspension feeder, a herbivore, and a carnivore.

(over)

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9.19 POPULATION AND POLLUTION IN THE UNITED STATES  
(9.2)

Ridker, Ronald G. (Resources for the Future, Inc., 1755 Massachusetts Ave., N.W., Washington, DC 20036)  
Science 176, No. 4039, 1085-1090 (June 9, 1972)

A simple model is described showing the links between environmental pollution on the one hand and population and per capita incomes on the other. The article points out (1) that no single cause is sufficient to explain the United States' environmental problems and (2) that there is little about the pollution problems this country is likely to face during the next 50 years that is inevitable.

The author states that it would not be difficult to devise government policies that would alter the composition of consumption and induce technological developments that could have significant positive effects on the parameters, nor is it impossible to bring about beneficial changes in the distribution of population and in our institutions. Furthermore, he states that it is not impossible that improvements from these changes during the next 50 years could offset the effects of population growth, per capita incomes, and other factors working in the opposite direction.

Nevertheless, great changes in attitudes and behavior patterns are likely to be necessary. A slowdown in population growth would provide us with more time (1) for vestiges of attitudes and institutions developed in frontier days to die off, (2) for the power struggle between vested interest groups to be played out, and (3) to devise and implement solutions.

[1 figure, 3 references]

FTP

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9.19 OIL POLLUTION: PERSISTENCE AND DEGRADATION  
OF SPILLED FUEL OIL

Blumer, Max, and Jeremy Sass (Woods Hole Oceanographic Institution, Woods Hole, MA 02543)  
Science 176, No. 4039, 1120-1122 (June 9, 1972)

The facts presented in this article indicate that oil products and crude oils have a considerable persistence in the environment.

Approximately 600 metric tons of number 2 fuel oil were spilled in Buzzards Bay, Mass., on 16 September 1969. Following the spill three distinct series of events took place. Within the first few hours and days after the spill, there was a heavy kill of organisms that came in contact with the oil (this effect extended over all phyla and over benthic and intertidal organisms). After weeks or months of the spill, the oil spread to areas that had not been touched initially and the kill area was extended. For a considerable time after the oil spill, the oil prevented resettlement of the sediments by the original fauna. Now, 2 years later, fuel oil hydrocarbons still persist in the marsh and in offshore sediments; however, degradation of the oil is evident. With these chemical changes in the oil, the immediate toxicity of the oil in the sediment has been reduced. This reduction in toxicity has permitted some resettlement of the polluted region.

Apparently, hydrocarbon degradation proceeds slowly, especially below the surface of the sediment, and takes place principally through microbial action on the alkanes and through partial dissolution of the lower-boiling aromatic hydrocarbons. These observations are in agreement with the known geochemical stability of hydrocarbons. [2 figures, 8 references]

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9.19 ENVIRONMENTAL APPLICATIONS OF THE WEIBULL DISTRIBUTION FUNCTION:  
OIL POLLUTION

Mikolaj, Paul G. (Department of Chemical and Nuclear Engineering, University of California, Santa Barbara, CA 93106)  
Science 176, No. 4038, 1019-1021 (June 2, 1972)

The Weibull distribution function is used here as a correlating model for statistically analyzing and interpreting environmental pollution data. In this article, pertinent features of the Weibull distribution function are summarized and several examples dealing with oil pollution are given to illustrate the method's potential.

The Weibull equation, an empirical three-parameter distribution function, is expressed in linearized form as:

$$\ln \ln [1 - F(x)]^{-1} = -\ln a + \beta \ln x - \gamma$$

$F(x)$ : cumulative probability that a variable will have a value of  $x$  equal to or less than a given value.

$a$ : a scale parameter

$\beta$ : a shape parameter

$\gamma$ : a threshold parameter.

The Weibull distribution function has been applied to fatigue (life) testing, quality control, particle size analysis, and odor threshold. The author believes that this is the first time that the Weibull distribution function has been applied to pollution monitoring problems. He suggests that the Weibull distribution may be applicable to environmental problems such as automotive emissions, pesticide and trace metal contaminant concentrations, marine fauna mortality, and others. It may be useful too in evaluating the effectiveness of pollution control measures. [1 figure, 1 table, 8 references]

FTP

9.19 MERCURY EMISSIONS FROM COAL COMBUSTION

Billings, Charles E. (Environmental Engineering Science, 740 Boylston Street, Chestnut Hill, MA 02167), and Wayne R. Matson (175 Bedford Street, Burlington, MA 01803)

Science 176, No. 4040, 1232-1233 (June 16, 1972)

O. I. Joensuu estimated the world amount of mercury (Hg) mobilized from combustion of coal at 3,000 metric tons per year [Science 172, 1027 (1971)]. Data on mercury content of fuels and emissions are needed relative to the problem of environmental mercury. This report presents data on mercury concentrations and flow rates in samples of coal, ash, water, fly ash, and flue gas from a large steam generator fired with pulverized coal. The furnace served a 755-Mw (net) steam turbine-driven generator.

The mercury liberated during combustion of coal is discharged as vapor in the flue gas or retained in the furnace ash. In a furnace fired with pulverized coal, about 90% by weight of the mercury released appeared in the flue gas and about 10% remained in the furnace ash. For the furnace examined in this test, approximately 2.5 kg. of Hg per day are released in the flue gas discharge. The average concentration of Hg in the various materials was as follows ( $\mu\text{g}$  of Hg per g. of material): coal, 0.03; furnace bottom ash, 0.2; recirculation duct and economizer hopper ash, 0.2; electrostatic precipitator hopper ash, 0.2; water return to river, 0.100; suspended fly ash, 0.2; and flue gas, 0.033. The authors indicate that the biological effects of the transport of airborne mercury are not known, and that the technology for control of mercury emissions from large (coal combustion) sources has not been developed.

[1 table, 9 references]

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The distribution of mercury in the organisms was studied. In the alga *Fucus vesiculosus*, the highest levels were found in the stipe and holdfast. In the remainder of the thallus there was a gradual increase toward the apical region. The concentration of mercury in the mollusc *Mytilus edulis* (L.) was greatest in the ctenidia, which may represent the principal organs of uptake and release. The concentrations of mercury varied during a 9-day period, which indicated rapid accumulation and loss in the algae studied.

High levels of mercury were found in the liver and kidneys of a gray seal and an eider duck. Both had died from causes unrelated to mercury accumulations.

SW [3 tables, 12 references]

accompanied by check or money order payable to NTIS for \$3.

Reprinted

Department of State Bulletin 67, No. 1733, 296 (Sept. 11, 1972)

The Department of State has arranged for publication of the report of the United Nations Conference on the Human Environment held at Stockholm, Sweden, June 5-16. The document, totaling 135 pages, will be reproduced by the National Technical Information Service (NTIS) of the Department of Commerce. Orders for the report should cite accession number PB-211-133 and the title, "Report of the UN Conference on the Human Environment, held at Stockholm June 5-16, 1972." Orders should be addressed to the NTIS, Department of Commerce, Springfield, VA 22151.

9.19 U.N. ENVIRONMENT CONFERENCE REPORT PUBLISHED FOR PUBLIC SALE

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or other agents. The authors suspect that clotting is not triggered directly by phosphorus but is an indirect result of the damage to the antennal ganglion and the hepatopancreas.

The lobster hepatopancreas is a lipid-rich organ that can concentrate yellow phosphorus to a level 1,000 to 2,000 times that in surrounding sea water. Yellow phosphorus can be rapidly cleared from lobsters by transferring them to uncontaminated water; the toxic effects on the lobster are cumulative and not rapidly reversed. Continuous exposure of the lobsters to phosphorus increases tissue damage until death occurs.

[1 figure, 8 references]

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Noshkin, Victor E. (Woods Hole Oceanogr. Inst., Woods Hole, Mass.)  
Chemical Abstracts 76, No. 25, 150574y (June 19, 1972)

9.19 ECOLOGICAL ASPECTS OF PLUTONIUM DISSEMINATION  
IN AQUATIC ENVIRONMENTS. WHAT HAS PLUTONIUM DATA TO TELL US  
ABOUT OTHER TRANSURANICS



### 9.3 SOVIET POLICY ON INTERNATIONAL REGULATION OF HIGH SEAS FISHERIES

Hayashi, Moritaka (Woodrow Wilson International Center for Scholars)  
Cornell International Law Journal 5, No. 2, 131-160 (Spring 1972)  
Card A

The increased fishing of the high seas by the various nations of the world has caused problems related to international law and conservation of fishery resources. To help resolve some of these problems, fishing countries have concluded agreements, bilateral and multilateral, concerning fishing on the high seas. This article is a review of U.S.S.R. participation in such international fishing agreements and contains a discussion of the salient features of the U.S.S.R. approach to international cooperation in regard to high seas fishing. The four sections of the article deal with (1) the degree of sovereignty limitation recognized by the U.S.S.R. in the context of fisheries regulations, (2) the policy statements on the conservation of living resources of the seas, (3) treaty practice on high seas fisheries, and (4) the enforcement of high seas fisheries regulations.

There are four fisheries treaties classifiable as Normative Nationalist, six as Functional Nationalist, three as Functional Internationalist, and none as Normative Internationalist. The Normative Nationalists adhere to the strict notion of state sovereignty (nation-states deserve the resources to survive and prosper). The Functional Nationalists adopt the notion that although nation-states are no longer the best machinery for solving problems of high seas fisheries, they can still play a major part in their solution (they assume that the nation-state is still viable, perhaps the most useful institution to entrust decisions requiring political and economic power). The Functional Internationalists adopt the view that the international system has undergone a revolutionary change, and that nation-states are no longer the best institutions to serve the needs of men (they are

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### 9.3 SOVIET POLICY ON INTERNATIONAL REGULATION OF HIGH SEAS FISHERIES

Hayashi, Moritaka (Woodrow Wilson International Center for Scholars)  
Cornell International Law Journal 5, No. 2, 131-160 (Spring 1972)

Card B

countries, belong to Functional models. All the treaties with only Communist participation are Normative Nationalist; all Functional treaties have non-Communist participation. Apparently Functional models are freer from ideological considerations. No Normative Internationalist treaty exists.

The author believes that the U.S.S.R. has demonstrated a rather strong willingness to make exceptions to her jurisdictional sovereignty in the fisheries aspects of international law, particularly so in the case of East-West arrangements. If this trend continues, development of closer East-West cooperation in the form of stronger Functional models in the fisheries area may be expected. Whether it will take the form of Functional Internationalist or Functional Nationalist may depend upon the future successful implementation of the inspection schemes of the ICNAF, NEAFA, and IWC conventions. [112 footnotes]

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### 9.3 APOSTROPHE TO A TROUBLED OCEAN

(9.19)

Smith, George P., II (Environmental Protection Agency, Washington, D.C.)  
Indiana Legal Forum 5, No. 2, 267-299 (Spring 1972)

The author discusses the menacing growth of marine pollution and the work that has started towards containing it. He discusses the emerging law of the seas, the various problems related to any proposed law for the seabed, the uses and abuses of the oceans, and the various resolutions relative to the area of marine pollution.

In conclusion, the author states that man's progressive achievements have been accompanied by progressive imbalances in the world ecosystem. After nearly exhausting the resources of the land, man has now turned his attention to the resources of the ocean. Replacements for foodstuffs and minerals taken foolishly from the land are to be found in the oceans--the opportunity is here again for man to start afresh.

What has been the past history on land must not be the beginning of the future for the oceans. New working concepts for the oceans must be employed in order to allow continued scientific advances. Law and science must work together toward a common goal of conserving the oceans. The problems raised by pollution of the environment, by conservation and development of the ocean resources, and by the economic needs of the developing countries require an innovative approach.

In the Epilogue, the author discusses the Draft Open Space Treaty presented by the Government of Malta in the United Nations' Seabed Committee for consideration of Pacem In Maribus II (The Second of two convocations held at Malta to

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### 9.3 THE TROUBLE WITH MERCURY: CAN DOMESTIC LAWS CONTAIN AN INTERNATIONAL THREAT?

(9.19)

Silverstein, David (Cornell International Law Journal, Cornell Law School, Ithaca, NY 14850)

Cornell International Law Journal 5, No. 2, 219-241 (Spring 1972)

Mercury pollution of the environment is a widespread and dangerous problem. But, the problem can be solved. It requires the concerted effort on the part of all nations against all forms of pollution. The United States, having shown interest in an international solution to pollution problems, should consider certain steps it can take domestically to pave the way for international agreement. Some of these steps are (1) enactment of effluent standards, (2) establishment of a technological review board, (3) legitimization of AID efforts to control pollution in host countries, (4) enforcement of controls over domestic corporations abroad, and (5) reconsideration of the Connally Reservation. [The "Connally Reservation" to the United States Declaration under Article 36(2) of the Statute of the International Court of Justice has cost the United States valuable foreign claims and may cost the United States the chance to ever play a major role in enforcing international pollution standards before the World Court. It reads as follows: "... the United States of America recognizes as compulsory ipso facto and without special agreement, in relation to any other State accepting the same obligation, the jurisdiction of the International Court of Justice in all legal disputes hereafter arising concerning treaties and questions of international law provided, that this declaration shall not apply to ... (b) disputes with regard to matters which are

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COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 11 PAGE 23

Gamble, John King, Jr. (compiler) (Division of Marine Resources, University of Washington, Seattle, WA 98105)  
Washington Sea Grant Publication WSG 72-2, 438 pp. (June 1972), Price \$7.50. (Division of Marine Resources, University of Washington, Sea Grant Program, Seattle, WA 98105)

Because of the existence of a large number of marine related treaties, some system for locating detailed information contained in them was needed. This index provides for such need. It includes all marine treaties found in volumes 1 to 643 of the United Nations Treaty Series, in the Canadian Treaty Series from 1946 to 1967, and in the United States Treaty Series from 1950 to 1970. The index, thus, lists most of the world's marine treaties and virtually all of those to which the United States and Canada are party. It includes 400 treaties.

The index is divided into three sections. Part 1 is ordered alphabetically by content. Part 2 is ordered first by treaty number and then alphabetically by content. Part 3 is divided into broad topical areas, boundary and frontier matters, fishing and fisheries, navigation, commission or institution related, pollution and conservation, and miscellaneous.

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conscious of those who use the oceans and are willing to perform services for users). The Normative Internationalists take the view that international bodies should have extensive jurisdiction over the matter of enforcing fishing regulations on the high seas (they hope that internationalizing all or part of the world's oceans or their resources is a key element in a great design to assure world peace and prosperity). The treaties can be placed on a national-international chart as follows:

<u>Normative Nationalist</u>	<u>Functional</u>	<u>Functional</u>	<u>Normative Internationalist</u>
West Pacific Research Agreement	IWC Conv.	ICNAF Conv. NEAFC Conv. IWC Conv. (proposed)	
Black Sea Fishery Agreement	ICNAF Conv. NEAFC Conv.		
King Crab Fisheries	Northwest Pacific Fisheries Conv. King Crab Fish- eries Agreement		
Agreement	North Pacific Fur Seals Conv.		
North-east Atlantic Seals Agreement			

All the high seas fishery treaties which are most significant in terms of the international fishing grounds they cover and of the participation by major fishing [continued on Card B]

essentially within the domestic jurisdiction of the United States of America as determined by the United States of America ...

The decisive factor regarding mercury pollution is not how soon international agreement can be reached but rather what is done during the interim period. The author believes that if the necessary procedures and machinery could be established in advance by enough countries, with the United States leading as an example, any international agreement would be just a formality.

[104 footnotes]

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[148 footnotes]

The author reviews some of the current approaches to the solution of water

Clingan, Thomas A., Jr. (University of Miami, Miami, FL 33124)  
University of Miami Law Review 26, No. 1, 223-254 (Fall 1971)

9.3 LAW AFFECTING THE QUALITY OF THE MARINE ENVIRONMENT  
(9.19)

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postulate workable proposals for resolution of problems concerning the protection and conservation of the oceans). This Draft Treaty contains 194 articles and 30 chapters, and attempts to update the present law of the seas. It abolishes the concept of the continental shelf. The ocean space is divided into "national" and "international" open spaces, with the dividing line set at 200 miles from shore. Within that line are additional lines at 12 and at 25 miles from shore that determine the space for various functions such as security and research. Basic rules involving activities on the ocean are set at the international level, but their enforcement is delegated to the coastal state. Revenues from exploitation of the living and nonliving ocean resources are for the benefit of the international community.

The freedom to fish on the open seas was deleted in the Draft Treaty for a "freedom of scientific research." This concept recognizes that freedom to fish is economically wasteful and ecologically dangerous, and that management of fisheries at an international level is needed to safeguard this common heritage of

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mankind. [472 footnotes]

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[122 footnotes]

This study discusses the legislative efforts of Canada relative to pollution in the Arctic and includes an examination of the multinational efforts of IMCO (Inter-Governmental Maritime Consultative Organizations) in dealing worldwide with similar problems. [122 footnotes]

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Ottawa Law Review 5, No. 1, 32-64 (1971)

9.3  
(9.19)  
POLLUTION PREVENTION IN THE ARCTIC--NATIONAL AND  
MULTINATIONAL APPROACHES COMPARED



Stevenson, John R. (U.S. Department of State, Washington, D.C.)  
International Lawyer 6, No. 3, 465-477 (July 1972)

The present crisis in the Law of the Sea is of vital importance to all citizens of the United States because it affects the mobility of U.S. naval and air forces, the development of the most important new resources of petroleum and hard minerals, and the availability of animal proteins from fish. Apparently bilateral conflicts between nations are escalating because of the increasing importance of their disagreement over legal rights in the ocean. The author reviews U.S. policy in light of the preparations for the upcoming 1973 Law of the Sea Conference, emphasizing the unsettled issues. He discusses the background and history of the crises and U.S. policy, the development of the freedom of the seas doctrine, the 1958 and 1960 Law of the Seas Conferences, the technological breakthroughs since World War II, the unilateral claims by coastal states, and United States policy.

The basic components of U.S. Oceans policy are summarized as follows:

(a) The U.S. proposed a move from the present position of a 3-mile territorial sea to an agreed 12-mile territorial sea, provided freedom of transit through and over straits used for international navigation is guaranteed.

(b) The United States has proposed that coastal states be given regulatory jurisdiction and preferential economic rights, based on their capacity to catch, with respect to coastal species of fish adjacent to their coasts as well as anadromous species (such as salmon) that spawn in their rivers but swim far out into the oceans before returning to the rivers where they originate.

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[Authors and titles listed below]

San Diego Law Review 9, No. 3, 383-746 (May 1972)

Card A

"Foreword. The Law of the Sea Negotiations 1971-1972 -- From Internationalism to Nationalism," by H. Gary Knight (Louisiana State Sea Grant Legal Program), pp. 383-389.

The author believes that the contributions contained in this report of the symposium may offer some of the most creative concepts yet in an effort to take "creeping nationalism" in stride and so handle it at the current Law of the Sea negotiations and in the 1973 Conference as not to forever prejudice the possibility of a meaningful international oceans regime.

"The Concept of 'Common Heritage of Mankind': A Political, Moral or Legal Innovation?" by Stephen Gorove (University of Mississippi School of Law), pp. 390-403.

The author briefly analyzes the meaning of common heritage as used in the phrase "common heritage of mankind" and indicates some of the difficulties inherent in the use of the term in current Law of the Sea negotiations. The concept of "common heritage of mankind" carries no clear juridical connotation but belongs to the realm of politics, philosophy, or morality, and not law. Although the conclusion that the concept is not at the present time a legal principle but only a reflection of political aspirations does not imply any value judgment de lege ferenda (on the basis of new law). In fact, the author states, perhaps the time has come for the law to move in the direction of recognizing mankind's interests, its rights and obligations, as distinct from those of the nation state and provide for a fully representative international body with appropriate authority to act in its behalf. Perhaps, then, the United Nations may have taken a landmark decision

[Authors and titles listed below]

San Diego Law Review 9, No. 3, 383-746 (May 1972)

Card B

(as proposed in this article). The Federal role in fisheries management must be strengthened. Total Federal regulation and management is indicated in those fisheries clearly affecting the public interest. Assistance to the fisheries should be continued, but on a modified scale to conform to management decisions. The thrust of this assistance should be to increase information and incentives for the local fishermen. The author ends his article by asking "why not try something new?"

"Bridging the Gap to International Fisheries Agreement: A Guide for Unilateral Action," by Jon L. Jacobson (University of Oregon Law School), pp. 454-490.

National assertions of jurisdiction over ocean space for fisheries purposes "contributes to the creeping disintegration of an important area of the earth's surface that might otherwise, if given time, be set aside as the common heritage of mankind." The author proposes (in view of the apparent trend toward overexploitation of certain stocks of the world's commercial fishes, and in light of the proven incapacity of the international community to come to effective agreement on any important topic in anything like a timely fashion) coastal nations ought to be allowed to take emergency resource-protective action in the high seas within the following guidelines: (1) Any protective action must be in response to a demonstrable conservation crisis; (2) the protective action must concern solely the protection of the endangered resource; (3) the action must not unreasonably discriminate on the high seas against nationals of other nations, (4) the action must

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San Diego Law Review 9, No. 3, 383-746 (May 1972)

Card C

would apply; (5b) substantive limitations on such coastal state rights; (6a) rights of individual states to explore and exploit the natural resources of the seabed beyond the limits of the continental shelf; (6b) rules and conditions under which such exploration and exploitation would take place; and (6c) institutional and legal means of administering such exploration and exploitation and of resolving disputes arising from such activities.

The conferees at the next Law of the Sea Conference will seek to negotiate mutually satisfactory answers to the foregoing major questions.

[33 + 1 + 1 footnotes]

"Recent Developments in the Law of the Seas III: A Synopsis," by G. Edward Arledge, Allan A. Nadir, and Robert L. O'Connell (San Diego Law Review, University of San Diego, San Diego, Calif.), pp. 608-746.

This third synopsis is part of the continuing effort of the editors of this journal to present annually a summary of legally significant events relevant to the law of the seas. The synopsis covers the period between March 1, 1971, and February 1, 1972. The primary sources utilized in preparing the synopsis consisted of the New York Times, the Environment Reporter, the United States Code Congressional and Administrative News, and the Congressional Record. This synopsis should be of interest and of use to those concerned with the area of the law of the sea and its importance to man's future, and to the Third United Nations Conference on the Law of the Seas in 1973.

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by declaring the seabed and the ocean floor beyond the limits of national jurisdiction to be the common heritage of mankind. [39 footnotes]  
"The Council of an International Sea-Bed Authority," by Louis B. Sohn (Harvard University, Cambridge, Mass.), pp. 404-431.

The international regime for the exploration and exploitation of the seabed to be agreed upon at the 1973 Law of the Sea Conference will consist of a basic set of rules and an international machinery for the implementation of these rules. The article contains a discussion of the problems involved in structuring the decision-making organ of an international oceans organization so that (1) it will be politically acceptable to all interests and (2) it will be operationally functional. If a meaningful international regime is adopted, this may be the single most important feature of the international machinery because the decisions made by the "Council" will be the basis for all seabed operations. The author gives his suggestions for a more representative Council of the future International Sea-Bed Authority and proposes a number of alternative patterns. The work is, therefore, of interest to those who must identify the issues, consider the alternatives, and negotiate the regime to be adopted at the Third Conference of the Law of the Sea. [45 footnotes]

"A Second Look at United States Fishery Management," by Thomas A. Clingan, Jr. (University of Miami, Fla.), pp. 432-453.

In the management and regulation of U.S. fisheries, a combination of factors, including maximum sustained yield and maximum economic yield, should be used by a group on as low a level in the bureaucratic system that is competent to deal with the totality of the stock. Industry participation at this level is essential. Limited entry will probably play an essential role if the fisheries are to grow and prosper. Decisions should be under the supervision of a Federal advisory group [Continued on Card B]

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(c) The United States has proposed, relative to the seabed's mineral resources an intermediate zone approach--an area of mixed coastal state and international jurisdiction between the area of coastal state sovereign rights and a fully international area beyond.

(d) The United States supports maximum freedom of scientific research, with maximum efforts to ensure dissemination of the results of such research.

(e) The United States is seeking to bring ocean pollution under effective international regulation in a number of different forums.

The author believes that it would be a serious mistake for the General Assembly of the United Nations to postpone the Law of the Sea Conference beyond 1973. It is important to the success of the Conference that governments begin to take the hard political decisions on which a consensus may be based; delay would only increase the difficulty. The law of the sea must be modernized by general international agreement; otherwise, it will give way to a partition of the oceans and contribute to a disintegration of international law generally. However, the present crisis does present a challenge because if the international community can develop effectively functioning international law and institutions for the oceans, greater reliance might eventually be placed on such law and institutions generally. FTP

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A DRAG ANCHOR ON KNOWLEDGE: THE LAW OF THE SEA AND MARINE RESEARCH

Woodhead, William (Utah Law Review)  
Utah Law Review 1971, No. 4, 524-543 (Winter 1971)

In this note, the author discusses the current law of the sea as it affects fundamental research, explores some suggested approaches for improving the situation within and without the current legal regime, and draws some conclusions as to what form the recommendations for altering the existing legal framework should take in order to meet the requirements of marine science research.

Developments in the law of the sea relative to the extent and limits of coastal state jurisdiction have brought about restrictions on the freedom of scientific research in the ocean environment. The present legal restrictions are likely to cause even greater problems in the future if the present legal framework is retained. Any further discussion of ocean law must consider the needs of the scientific community; a multilateral convention devoted only to requirements of the scientific community. This scientific convention, alone, should govern scientific activities.

The author concludes that the creation of an effective regime for scientific freedom will further enhance man's knowledge of the ocean area and will reap benefits that will serve all persons in the world equally and extensively. FTP [100 footnotes]

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carry an automatic termination time, and (5) the protective action must be accompanied by a clear call for international agreement. [121 footnotes]

"The Deep Seabed Hard Mineral Resources Bill," by F. M. Auburn (University of Auckland, New Zealand), pp. 491-513. [133 footnotes]

"Oil Pollution Problems Arising Out of Exploitation of the Continental Shelf: The Santa Barbara Disaster," by David J. Walmsley, pp. 514-568.

The author discusses the problems of using the United States' legal system to secure redress for damages resulting from oil pollution at sea and to prohibit or regulate such activities in the future. [253 footnotes]  
"The Donnellybrook Fair of the Oceans," by David B. Stang (George Washington University), pp. 569-607.

Major questions which many states feel were not resolved with adequate precision and detail in the text of the four 1958 Geneva Conventions on the Law of the Sea, or which need be reexamined with a view toward finding new answers are (1) the limits, seaward, of the territorial sea; (2) the precise limits, seawards, of the continental shelf; (3a) measures that coastal states may take in high seas areas adjacent to their coasts to regulate the activities of foreign fishing fleets and the distance from the coastline in which such coastal state rights would apply; (3b) substantive limitations on such coastal state rights; (4a) measures that coastal states may take in high seas areas adjacent to their coasts to protect themselves against marine pollution caused by foreign states or their nationals and the distance from the coastline in which such coastal state rights would apply; (4b) substantive limitations on such coastal state rights; (5a) means which coastal states may take in high seas adjacent to their coasts to regulate the conduct by foreign nationals of scientific research on the high seas and underlying seabed and the distance from the coastline that such coastal state rights [Continued on Card C]



[Authors and titles listed below]

Natural Resources Journal 12, No. 2, 133-277 (April 1972)

Card A

"Towards a New Methodological Approach in Environmental Law," by Dante A. Caponera (FAO Legal Office, FAO, Rome, Italy), pp. 133-152.

The problems of protecting the environment are new ones everywhere in the world, and the existing legal and administrative structures preclude rapid and all-embracing solutions. The task of the legislator is a difficult one due to the technical, scientific, economic, and social implications of the problems. New legal and institutional tools are needed to secure rational exploitation of the natural resources. Future action should consider two main parts. The first would be an examination of existing laws and institutions in any interested state and in other nations to determine their functional value, and then to seek overall solutions for which present laws and institutions may not be adequate. The second would be the study and enactment of new laws regulating those products which cause the degradation or pollution of the environment, involving standards, quality, manufacture, and marketing. In the meantime, there is a need to develop new legal and institutional structures that are designed in such a way as to deal with each and every natural resource in its entirety and each and every respect. Finally, the development of new legal and institutional structures should be considered that are able to recognize and define the rights of each individual and of the community at large to a decent environment as one of the basic human rights.

[41 footnotes]

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[Authors and titles listed below]

Natural Resources Journal 12, No. 2, 133-277 (April 1972)

Card B

"Pollution & Liability Problems Connected With Deep-Sea Mining," by L. F. E. Goldie (International Legal Studies Program, Syracuse University College of Law, Syracuse, N.Y.), pp. 172-181.

This article is a discussion of the liability issue as a deterrent to pollution of the sea as a relatively inferior, insensitive, and unsatisfactory weapon of remedy and control. [28 footnotes]

"The Resolution of Uncertainty," by Harold P. Green (George Washington University), pp. 182-186.

There appears to be a need for building into the political process some device for identifying and impressing upon the public, in a comprehensible manner, the fact that uncertainty exists as to the potential environmental effects of technology. The author believes that scientific questions, no less than economic and social questions, should be resolved in the crucible of uninhibited political debate in the faith that a democratic people is entitled, rationally or irrationally, to the public policies it wants, and that in the long run truth will prevail.

"The Human Environment: Problems of Standard-Setting and Enforcement," by Ian Brownlie (Wadham College, Oxford, England), pp. 187-194.

Legal standards, procedures, and institutions are only effective if the politicians, the administrators, and the public are convinced of the importance of

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Natural Resources Journal 12, No. 2, 133-277 (April 1972)

Card C

requirements; and (4) recognition and assessment of environmental problems and measures for abatement and control require considerable research and development work, which could be done more rapidly and less expensively if knowledge and experiences could be exchanged between states. The author discusses the present stages of international considerations regarding environmental protection and the chances that regulations dealing with common (frontier) problems have of being included in bilateral international agreements. [15 footnotes]

"Legal Responses to Pollution Problems--Their Strengths and Weakness," by Andrew R. Thompson (University of British Columbia, Vancouver, British Columbia, Canada), pp. 227-241.

The law can respond in four ways to pollution problems: (1) It can apply the coercive power of the State to the offender, (2) it can manipulate the incentives and disincentives of the economic system to bring pressure on the pollution offender, (3) it can organize the administrative and institutional structures of the State to control the offender, and (4) it can contribute to the consciousness of citizens that the natural environment must not be abused. The article is a discussion of these four types of responses. [50 footnotes]

"National Sovereignty in International Environmental Decisions," by Charles R. Ross (Hinesburg, VT 05461), pp. 242-254.

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Royce, William F. (College of Fisheries, University of Washington, Seattle, WA 98195)

Fishery Bulletin 70, No. 3, 681-691 (July 1972)

No single curriculum is ideal for training in fishery science. The field has become much too broad and includes too many specialties that each require a high level of training. The specialization is expected at graduate level, of course, but is desirable even at undergraduate level if students can anticipate either the graduate work or the type of job they will enter.

A corollary of the above conclusion is that a person with a terminal baccalaureate degree should not be a dropout from a research-oriented, two-degree or three-degree program. A majority of the jobs in fishery science has been held and probably will continue to be held by people with only a baccalaureate degree. Some of these jobs will be major administrative, decision-making jobs with rewards equal to those that will be open to holders of a doctorate degree.

A biology or zoology undergraduate major may be good preparation for graduate work in fisheries, but it is relatively poor preparation for a job. Advanced biology courses in general are much less useful than courses in English composition, public speaking, fishery science and management, and the quantitative sciences.

Student and faculty opinions about curricula are probably not the best guides. Both differ substantially from the opinions of a majority of the nonteaching professionals in the field, especially in their evaluation of subjects that develop the ability to deal with people.

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## 9.3 (9.19)

protection. Legal intervention must be part of a well-developed economic and social program, accompanied by well-informed persuasion.

"Global Pollution and Human Rights," by Abel Wolman (Johns Hopkins University, Baltimore, MD 21218), pp. 195-210.

Law alone, at least from past experiences, does not produce the desired result of protecting human rights, when certain ingredients in policy and action are missing. This is true because human behavior is complex, often selfish, often unpredictable, and often ignores human rights. The support provided by law assists in the protection of man and nature provided public intent, economic pressures, health, and safety so validate the law. [10 footnotes]

"The Individual and the Environment," by Christian de Laet and Susan Singh (Canadian Council of Resource and Environment Ministers), pp. 211-217.

The one area, which appears to hold the key to environmental pollution control, is through the development of the public conscience, an attempt to have people reassume the burden of the individual and collective responsibility that forms the cornerstone of our jurisprudence. This requires public dialogue on current and changing values, doctrines, and choices so that the responses formulated may be characterized by relevance, clarity, and finality. [5 footnotes]

"Chances and Problems of International Agreements on Environmental Pollution," by Klaus Boisserée (Ministry of Labor, Düsseldorf, Federal Republic of Germany), pp. 218-226.

Reasons for international agreements on environmental protection are (1) air and water pollution do not stop at national frontiers; (2) all methods of reducing environmental pollution constitute an economic burden for owners and operators of installations, therefore different requirements may result in distortions of competition; (3) trade obstructions may result from differing environmental protection [Continued on Card C]

## 9.3 (9.19)

"The Changing Structure of International Policy: Needs and Alternatives," by Lynton K. Caldwell (Indiana University, Indianapolis, IN 46204), pp. 153-160.

Regardless of their scientific content, the tasks of environmental protection, restoration, and management are social. Furthermore, they are institutional because human societies cooperate only through established sets of relationships and procedures. Man's social, economic, and political institutions have not developed in a manner consistent with the realities of the biosphere. As a part of the price of human survival and of an environmental future, institutions will have to be reshaped at all levels of human organization to cope with the problems of man-environment relationships that man himself has mainly created. These institutions should be developed in light of the following propositions: (1) The institutions for the administration of environmental policy, at all governmental levels, should be flexible, and should be capable of growth and transformation. (2) These institutions should be strengthened for environmental protection, bringing them into more consistent and mutually supportive relationships. (3) New institutions may need to be created because of the novelty of the tasks and of their worldwide character. (4) Finally, environmental considerations cannot be effective unless they are built into (thus modifying) man's so-called "development" activities. "Environmental Policy as a World Order Problem," by Richard A. Falk (International Law, Princeton University), pp. 160-171.

This article explores, from the legal aspect, the modern encounter between man and his environment in its global aspects. The author suggests that the present international legal system can generate, at best, stopgap measures that will defer the day of ecological reckoning, but that there is no realistic prospect that the conditions giving rise to this dangerous situation can be eliminated by reforms that involve the establishment of new international law regimes. [Continued on Card B]

## 9.7

Courses in the social sciences, humanities, and liberal arts have not been as useful as people now want them to be. With a few exceptions these subjects were characteristically among those listed as the least useful. The exceptions are important as indication of needed improvements because they include courses in resource economics and administration--both public and business. These are courses that are relevant to real problems, and it would appear that many social sciences-humanities-liberal arts courses have not been relevant hitherto.

The high value of general courses in science, both basic and applied, and the mixed value of advanced courses indicate the importance of teaching the general courses especially well.

There are advantages in a fishery education that is interrupted by periods of work. The student can form definite opinions about specialties that he needs for the job that he has or wants. In addition almost everyone can benefit from refresher courses that cover new developments.

[4 tables, 10 references]

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Published under the auspices of the Canadian Branch, International Law Association, by the University of British Columbia Press, Vancouver, British Columbia, Canada.

Carroz, J. E. (Member of the Secretariat of FAO, Rome, Italy)  
Canadian Yearbook of International Law 9, 3-29 (1971) (In French)

[THE INTERNATIONAL COMMISSION FOR THE FISHERIES  
OF THE SOUTHEAST ATLANTIC]  
LA COMMISSION INTERNATIONALE DES PÊCHES POUR L'ATLANTIQUE SUD-EST

9.4  
(9.3)

## 9.3 (9.19)

The author discusses the development of pollution control policies which have arisen between the United States and Canada in recent years and exemplified during hearings on the problem of pollution control in the Great Lakes. [20 footnotes]

"The Development of International Environmental Law and Policy in Africa," by J. D. Ogundere (Nigerian Institute of International Affairs), pp. 255-270.

Africa has taken rapid strides in the last 10 years to develop, on the international level, solutions to environmental problems relating to fauna, flora, and water resources. In the next 10 years, Africa should concentrate on the problems of over-population, urbanization, and pollution. [60 footnotes]

"The Conservation of Migratory Animals Through International Law," by Cyrille de Klemm (UNESCO), pp. 271-277.

Migratory animals, for legal purposes, are of two groups: interstate migrants (birds and certain species of fish) and international migrants (marine animals such as seals, turtles, and some fish). If conservation measures for these marine animals are to be effective they must cover the whole range of migratory species, requiring agreement between all the countries concerned; this is an international problem whose solution must be found through international law. [9 footnotes]

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0.4 METHYL MERCURY IN FISH. A TOXICOLOGIC-EPIDEMIOLOGIC EVALUATION OF RISKS

National Institute of Public Health, Sweden  
 Nord. hyg. Tidskr., Suppl. 4, 364 pp. (1971) (Stockholm)  
 BFMIRA Abstracts 25, No. 6, Abstract No. 2071, 418 (June 1972)

"The public health hazards of consuming fish contaminated with methyl mercury have been considered by a group of experts in Sweden. In a critical review of selected literature they assess analytical methods; the origin of organic mercury in the environment and in fish; its uptake and distribution in the body; symptoms and pathology of poisoning by methyl mercury; and the relations between exposure, organ concentration and degree of poisoning. They deduce from case histories that daily ingestion of about 0.03 mg of mercury, as methyl mercury, would lead to accumulation of proposed maximal acceptable levels in blood and hair, and they relate this figure to concentrations in contaminated fish and fish consumption in Sweden. A report of a symposium, held in Stockholm in 1968, on maximal allowable concentrations of mercury compounds in industry is appended." Reprinted

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 11 PAGE 29

0.7 FATTY ACIDS IN FOODS SERVED IN A UNIVERSITY FOOD SERVICE

Guild, Louise, Dorothy Deethardt, and Elizabeth Rust (Department of Home Economics, South Dakota Agricultural Experiment Station, Brookings, SD 57006)  
 Journal of the American Dietetic Association 61, No. 2, 149-151 (Aug. 1972)

Fatty acid composition of lipids in milk, eggs, meat, and fats and oils has been reported elsewhere. No such information exists for foods served in large-quantity operations as in a restaurant.

An investigation was undertaken to determine the fatty acid composition of food portions served in meals. Samples were taken of 56 foods served at South Dakota State University student cafeteria. The samples were prepared for gas-liquid chromatographic analysis. The results were listed in a table which shows 12 major fatty acids in terms of carbon chain lengths and number of double bonds for each of the foods examined.

Although at least 53 separate peaks in chromatographic analysis were found, no single sample had more than 40. The foods with the largest number of peaks contained fat from more than one source; for example, chocolate chip ice cream had 40 peaks, and a tuna fish sandwich, 39.

The 56 foods studied included beef meat loaf, chili, stews, spaghetti, pizza, pork sausage, pork gravy, bacon-lettuce-tomato sandwich, and others, such as salads covered with dressings. Data are given for the following fishery items: tuna sandwich, tuna noodle casserole, and fried perch. The data indicated a greater variety of fatty acids than expected.

[1 table, 12 references]

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COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 11 PAGE 29

9.12 OCEANIC ELECTRIC FIELDS: PERCEPTION BY AMERICAN EELS?

Rommel, S. A., Jr., and J. D. McCleave (Department of Zoology, University of Maine, Orono, ME 04473)  
 Science 176, No. 4040, 1233-1235 (June 16, 1972)

It has been suggested that aquatic animals might use the weak electric fields generated in the ocean by water currents moving through the geomagnetic field for orientation or navigation. Earlier work has shown that certain nonmigratory fish are sensitive to weak electric fields; for example, sharks and skates are sensitive to an electric field of 0.01  $\mu\text{V}/\text{cm}$ , and bullheads to 30  $\mu\text{V}/\text{cm}$ . Because there were no data on the electrosensitivity of migratory fish species, the authors examined the response of the American eels (*Anguilla rostrata*) to uniform, weak electric fields. This paper reports on the responses of the eels to such electric fields in fresh water (resistivity 4,000 ohm cm.) and salt water (400 ohm cm., 40 ohm cm.).

The American eels consistently exhibited conditioned cardiac deceleration responses to electric fields as small as 0.167  $\times 10^{-2}$  microampere per square centimeter in water of resistivity 4,000 ohm cm. (6.7 microvolts per centimeter) and 400 ohm cm. (0.67 microvolt per centimeter). Fewer responses occurred at this current density (0.167  $\times 10^{-2}$   $\mu\text{amp}/\text{cm}^2$ ) in more saline water (40 ohm cm., 0.067  $\mu\text{V}/\text{cm}$ .) and at a lower current density (0.167  $\times 10^{-3}$   $\mu\text{amp}/\text{cm}^2$ ) in fresh water. Nearly all the eels exhibited a conditioned response to perpendicular fields; no eels exhibited a response to fields applied parallel to their bodies.

The authors conclude that eels have sufficient sensitivity to electric fields to utilize geoelectric information for orientation.

[1 figure, 2 tables, 21 references]

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9.2 AN EXPOSITION ON THE DEFINITION OF FISHING EFFORT (9.12)

Rothschild, Brian J. (National Marine Fisheries Service, Northwest Fisheries Center, 2725 Montlake Boulevard East, Seattle, WA 98112)  
 Fishery Bulletin 70, No. 3, 671-679 (July 1972)

The term "fishing effort" is well defined in population dynamics literature. The term as defined in the population dynamics literature is, however, difficult to reconcile with broader definitions of fishing effort, particularly those having economic implications. The present paper discusses the distinction between the definitions and gives some examples in the context of allocating inputs, the capacities of fishing boats, and several stocks to the catch in a manner which maximizes profits. Managerial behavior is also an important input to the fishing process; this is discussed in a decision theory format where decision quality can be measured relative to entropy in the decision environment affording a comparison among decision environments in terms of information and an imputed valuation of a bit of information under various circumstances. The conventional measures of the quality of the decision environment are often based upon expected catch. Alternative measures are discussed which include the expected loss or the risk involved in the decision process.

[3 figures, 4 tables, 5 references]

Author's abstract

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e Laet, Christian	28	9.3	Matson, Wayne R.	22	9.19	Smolowitz, Ronald Joel	5	2.15			
Girolamo, R.	7	2.3	Matsumura, F.	19	9.19	Soares, Joseph H., Jr.	14	7.59			
blev, A.	9	4.20				Sohn, Louis B.	26	9.3			
own, Russell J. (pat.)	18	9.16				Spencer, Terry E.	2	0.38			
abrow, David L.	12	6.54				Srivastava, Anil K.	1	0.39			
agan, L. R., Jr.	9	3.2493									
stova, E. N.	8	3.15									
11, G.	14	7.42									



## COMMERCIAL FISHERIES ABSTRACTS

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# UNITED STATES DEPARTMENT OF COMMERCE

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## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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### FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

*Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.



0.32  
(1.85)

CRUSTACEAN COLOR-CHANGE HORMONE: AMINO ACID SEQUENCE AND  
CHEMICAL SYNTHESIS

Fernlund, Per (Division of Physiological Chemistry, Chemical Center, University of Lund, S-220 07 Lund 7, Sweden), and Lars Josefsson (Department of Biochemistry C, University of Copenhagen, D-2200 Copenhagen N, Denmark)  
*Science* 177, No. 4044, 173-175 (July 14, 1972)

Many crustaceans have the ability to change their body color, and color changes are produced by specialized hypodermal cells containing movable pigment granules. The cells are controlled through hormones secreted from nerve endings in the sinus gland, a neurohemal organ located in the eye stalks of most decapod crustaceans.

One color-change hormone, the blanching (red-pigment-concentrating) hormone, was isolated from the eyestalks of the prawn *Pandalus borealis*, and analyzed for composition and structure.

Quantitative amino-acid analysis of 8 µg. of hormone after hot, acid hydrolysis plus ultraviolet spectroscopy gave the following composition accounting for 89% of the initial weight: Asp, Glu, Gly, Leu, Phe, Pro, Ser, and Trp. The hormone was found to have a blocked NH<sub>2</sub>-terminus and to be electrophoretically immobile at all pHs, proving that it has no free carboxyl groups.

Digestion of the hormone with thermolysin, and fractionation of the digest on a column of Sephadex G-25, with further analysis, gave two major peptide fragments: one NH<sub>2</sub>-terminal, the blocked tripeptide (Asx, Gly, and Leu), and one COOH-terminal, the pentapeptide Phe-Ser-Pro-Gly-Trp-NH<sub>2</sub>. The sequence of the NH<sub>2</sub>-terminal part was determined by mass spectrometry to be pGlu-Leu-Asn-Phe-Ser-Pro-Gly-Trp-NH<sub>2</sub>.  
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0.321

DETERMINATION OF PROTEIN: A MODIFICATION OF THE LOWRY METHOD  
THAT GIVES A LINEAR PHOTOMETRIC RESPONSE

Hartree, E. F. (Agricultural Research Council, Unit of Reproductive Physiology and Biochemistry, 307 Huntingdon Road, Cambridge CB3 0JQ, England)  
*Analytical Biochemistry* 48, No. 2, 422-427 (Aug. 1972)

A linear relationship between concentration of a soluble protein and photometric response was provided by a modification of the Lowry procedure for the assay of protein concentration [O. H. Lowry, N. J. Rosebrough, A. L. Farr, and R. J. Randall, *J. Biol. Chem.* 193, 265 (1951); and G. L. Miller, *Anal. Chem.* 31, 964 (1959)].

Assays were carried out in medium weight, 13 mm. diameter test tubes matched for wall thickness. Protein samples were diluted to 1 ml. with water and treated with 0.9 ml. solution A (2 g. potassium sodium tartrate, 100 g. Na<sub>2</sub>CO<sub>3</sub> dissolved in 500 ml. 1 N NaOH, and diluted to 1 liter with water). A blank and a standard were set up similarly. The tubes were placed in a water bath at 50° for 10 min., cooled to room temperature (21°-25°), and treated with 0.1 ml. solution B (2 g. potassium sodium tartrate, 1 g. CuSO<sub>4</sub>·5H<sub>2</sub>O dissolved in 90 ml. water, containing 10 ml. 1 N NaOH). The solutions were left at room temperature for at least 10 min., then 3 ml. solution C was forced in rapidly to ensure mixing within 1 sec. (Solution C--1 vol. Folin-Ciocalteu reagent diluted with 15 vol. water. This solution--prepared daily--should be between 0.15 N and 0.18 N when titrated to pH 10 with 1 N NaOH.) The tubes were again placed in the 50° water bath for 10 min. and cooled to room temperature. Absorbancy was read in 1 cm. cuvetts at 650 nm.

Within the range of 15-110 µg. protein, there was direct proportionality between weight of protein and readings at A650; experimental points for standard protein solutions showed deviations in absorbance of 3% max. from the best straight

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0.34

FLUORESCENT THIOL REAGENTS. V. MICROFLUOROMETRY  
OF THIOL COMPOUNDS WITH A FLUORESCENT-LABELLED MALEIMIDE

Sekine, Takamitsu, Kimiyo Ando (School of Medicine, Juntendo University, Hongo, Tokyo, Japan), Minoru Machida, and Yutichi Kanaoka (Faculty of Pharmaceutical Sciences, Hokkaido University, Sapporo, Japan)  
*Analytical Biochemistry* 48, No. 2, 557-568 (Aug. 1972)

The thiol group in biochemical substances is necessary in critical events of biological processes [such as immunization, blood clotting, and detoxication]. Thiol-containing substances of biological interest include proteins and low molecular compounds such as cysteine, reduced glutathione, ergothioneine, and some coenzymes.

The available methods of assay for thiol compounds require a sample of at least several milliliters. The sample also requires the presence of about 10<sup>-5</sup> M of a thiol compound. Such amounts are not always available; thus, there is a need for a more sensitive method of analysis.

To meet this need, a new method for the quantitative determination of thiol compounds was developed and is based upon the fluorescence characteristics of the reagent N-(p-(2-benzimidazolyl)phenyl)maleimide (BIPM). BIPM adducts to thiol compounds have strong fluorescence; the reagent itself has no appreciable fluorescence. Observations of the method indicated that the addition reaction of 2 × 10<sup>-6</sup> M BIPM to thiols was complete within 30 min. at pH 6.85 and a temperature of 0° C. A linear relation was observed, up to 10<sup>-5</sup> M of the reagent, between concentration of adduct and intensity of fluorescence.

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0.35  
(7.599) (8.59)

ESTIMATION OF STEAM-VOLATILE N-NITROSAMINES IN FOODS  
AT THE 1 µG/KG LEVEL

Crosby, N. T., J. K. Foreman, J. F. Palframan, and R. Sawyer (Laboratory of the Government Chemist, DTI, Cornwall House, Stamford St., London SE1 9NQ, England)  
*Nature* 238, No. 5363, 342-343 (Aug. 11, 1972)

The carcinogenic and hepatotoxic properties of N-nitrosodimethylamine have been reported in other work. The authors suggest that any potential nitrosamine hazard through use of nitrates and nitrites in preserving and processing foodstuffs should be evaluated. The assessment of a possible hazard should include the combination of the necessary precursors and conditions under which nitrosamine formation can occur.

Nitrates are widely distributed in nature and can readily be reduced to nitrites by bacteria. The principal chemical route to N-nitrosamine formation is the reaction of secondary amines [amines containing the imino group :NH] with nitrous acid in the presence of nitrite ion. The authors state that there is little information on the occurrence of secondary amines in foods.

Sensitive and specific analytical methods for identification and estimation of N-nitroso compounds in food products are essential for evaluation of any health hazard due to N-nitrosamine formation. The authors have investigated various methods of separation of volatile N-nitrosamines. They used two types of nitrogen selective detector for preliminary examination of food extracts. Where a positive response was obtained, the extract was further examined by the combined gas-liquid chromatography and mass spectrometry technique of molecular ion monitoring using a high resolution instrument.

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0.31 COMPONENT FATTY ACIDS OF SOME MARINE ALGAL LIPIDS

Jameson, G. R., and E. H. Reid (Chem. Dep. Paisley Coll. Technol. Paisley/Renfrewshire, Scotland)  
Chemical Abstracts 76, No. 23, 137830j (June 5, 1972)

The hormone was compared with a peptide synthesized from amino acids, and containing the same amino-acid sequence as the hormone. No differences were observed in thin-layer chromatography, or in adsorption chromatography on Sephadex G-25. The mass spectrum of the synthetic peptide differed from the hormone only in numbers of peaks at certain  $m/e$  values. In addition, the synthetic peptide caused blanching of the prawn *P. borealis* and the shrimp *Palaeomon adspersus*. The results of these comparisons and analyses, the authors concluded, indicated the correct structure and composition of the hormone.

[1 figure, 1 table, 20 references]

SW

COGNITIVE EFFECTS ON HUNTING. 2. BEHAVIORAL IMPLICATIONS AND AMINO ACID COMPOSITIONS OF MYOGLOBINS FROM SHARK, BONY FISHES, TURTLE AND MAMMALIA

Tomita, Hiroshi, and Yasuhiko Tsuchiya (Dept. of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan)  
Tohoku Journal of Agricultural Research 22, No. 4, 228-238 (Dec. 1971)

As part of an overall study of the myoglobins, the authors report on the preparation and characteristics of the myoglobins from the dark muscle of salmon shark, mackerel, skipjack tuna, and bigeye tuna, and from the ordinary muscle of

As part of an overall study of the myoglobins, the authors report on the preparation and characteristics of the myoglobins from the dark muscle of salmon shark, mackerel, skipjack tuna, and bigeye tuna, and from the ordinary muscle of turtle, sperm whale, and horse. The myoglobins from these sources contained from 0.304 to 0.324% of Fe on the dry basis, with molecular weights of about 18,000. There was little difference in the infrared spectral nature of the protein moieties of the myoglobins of the seven animal species; however, significant differences existed in the amino-acid compositions. One mole of half cystine occurs per molecule of the myoglobins of salmon shark, mackerel, skipjack tuna, and bigeye tuna, but none occurs in the myoglobins of turtle, sperm whale, and horse. The N-terminal amino-acid residue in the myoglobin of the following species was identified: salmon shark--glycine; mackerel--threonine; turtle--phenylalanine; horse--glycine; and sperm whale--valine. [4 figures, 5 tables, 32 references]

0.321



0.35 AMINO-ACID SEQUENCE HOMOLOGY IN THE MUSCLE ALDOLASES  
(0.38) FROM STURGEONS OF DIFFERENT SPECIES

Gibbons, Ian, Richard N. Perham (Department of Biochemistry, University of Cambridge, Tennis Court Road, Cambridge CB2 1QW, England), and Peter J. Anderson (Department of Biochemistry, Faculty of Medicine, University of Ottawa, Ottawa 2, Quebec, Canada)  
Nature New Biology 238, No. 84, 173-174 (Aug. 9, 1972) (MacMillan Journals Limited, 4 Little Essex St., London WC2R 3LF, England)

The nature and number of amino-acid replacements between homologous proteins can provide information about the functional role of individual residues and about evolution. The amino-acid sequence of the enzyme fructose 1,6-diphosphate aldolase isolated from ox, pig, and rabbit muscle has been highly conserved throughout mammalian evolution. Comparison of the primary structure of the enzyme of the muscle from these mammals with that of a North Sea sturgeon indicated that the proteins were homologous, but a number of amino-acid replacements had occurred. A peptide containing the active-site-lysine residue and an 18 residue peptide adjoining it in the primary structure were isolated from aldolases obtained from the muscle of four species of sturgeon (*Acipenser*), and their amino-acid sequences were determined.

The peptides were obtained by S-carboxymethylating the pure aldolases in 8 M urea and then splitting them with cyanogen bromide. The peptide not containing the active-site-lysine was a straightforward cleavage product with cyanogen bromide. The peptide containing the active-site-lysine was produced by tryptic digestion of the purified cyanogen bromide-treated fragment of the protein.

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0.35 PURIFICATION AND PROPERTIES OF PROTEASES FROM A  
MARINE-PSYCHROPHILIC BACTERIUM

Kato, Nobuo, Toru Nagasawa, Shoji Adachi, Yoshiki Tani, and Koichi Ogata (Dept. of Agricultural Chemistry, Kyoto University, Kyoto, Japan)  
Agricultural and Biological Chemistry 36, No. 7, 1185-1192 (July 1972)

This is the second part of a series of papers on the proteases from a marine-psychrophilic bacterium. The first article was published on pages 1177-1184 of the same issue of this journal. This present article describes the various steps used in the purification of the proteases from the marine psychrophilic bacterium *Pseudomonas* sp. No. 548.

The protease system was fractionated by two-step chromatography using DEAE-cellulose into four components, each showing protease activity. Each protease was purified by gel filtration on Sephadex G-100 and G-75. In the first step, fraction I was eluted from the DEAE-cellulose column by 0.1 M NaCl; fraction II was eluted by 0.3 M NaCl. Each fraction subsequently yielded two proteases. Protease Ia was obtained in crystalline form; proteases Ib, IIa, and IIb were highly purified. Each of the four enzymes was inactivated by EDTA (ethylenediaminetetraacetate); proteases Ia, Ib, and IIb were inactivated by diisopropylfluorophosphate. Protease Ia showed optimum activity at pH 10.0; the other proteases at pH 7.0 to 8.0. Proteases Ia, Ib, and IIb were stabilized by calcium ion.

FTP

[9 figures, 2 tables, 12 references]

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0.35 SYNTHETIC SCOTOPHOBIN IN GOLDFISH: SPECIFICITY AND  
EFFECT ON LEARNING

Bryant, Rodney C., Nelson N. Santos, and William L. Byrne (Brain Research Institute and Department of Biochemistry, University of Tennessee Medical Units, Memphis, TN 38103)  
Science 177, No. 4049, 635-636 (Aug. 18, 1972)

Scotophobin is formed in the brains of rats learning to avoid a darkened compartment. The molecule has now been synthesized. It does show activity in mice. The present paper reports on the effect of synthetic rat scotophobin injected intracranially into common goldfish (*Carassius auratus*) that were then trained to avoid light or dark. The scotophobin interacts with the learning process in goldfish in an apparently specific way. It facilitates the acquisition of dark avoidance (a task homologous with that acquired by rats from which the natural peptide was isolated) and inhibits the acquisition of light avoidance.

[2 figures, 11 references]

FTP

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0.39 ROLE OF BASE COMPOSITION IN THE ELECTROPHORESIS  
OF MICROBIAL AND CRAB DNA IN POLYACRYLAMIDE GELS

Zeiger, Robert S., Raphael Salomon, C. Wesley Dingman, and Andrew C. Peacock (Chemistry Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD 20014)  
Nature New Biology 238, No. 81, 65-69 (July 19, 1972)

[Molecules of different size and chemical composition exist in DNA; this characteristic is called heterogeneity. The molar proportions of bases (base ratio) in DNA represent a statistical average which is constant for a given species. Analyses of the base composition shows that there is a compositional diversity relative to a species and it is expressed in ranges of mole percent G+C (guanine-cytosine). There is a physicochemical method of analyzing DNA which not only determines the base ratio but also clarifies the concept of heterogeneity. The method consists in the determination of the buoyant density of DNA in a linear gradient of CsCl generated in an ultracentrifugal field. At equilibrium the DNA molecules concentrate in a region of the gradient corresponding to their buoyant density. The distribution of the molecules is Gaussian (distributed in a bell-shaped, symmetrical pattern), and the mode (the value that occurs most frequently) therefore corresponds to an equilibrium position where centrifugal and thermal forces are equal. The variance of this distribution is thus a measure of heterogeneity. It has been shown that the buoyant density corresponding to the mode is directly proportional to the G+C molar content. Abstractor's note]

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Shin, Bak C., John W. Huggins, and Kermit L. Carraway (Dept. of Biochemistry,  
Oklahoma State University, Stillwater, OK 74074)  
*Lipids* 7, No. 4, 229-233 (Apr. 1972)

Malonaldehyde is one of the major products of the oxidation of lipids. It reacts readily with proteins. In order to better understand the effect of malonaldehyde on proteins, the effect of some parameters affecting the reaction were studied. In the present study, the inactivation of several enzymes (ribonuclease and papain) by malonaldehyde was examined.

Malonaldehyde reacts with the enzymes to cause inactivation, the production of fluorescence, and the cross linking of protein molecules. Each of the reactions is pH dependent with a different optimum pH level. The presence of essential sulfhydryl groups in the enzyme does not appear to be significant to the rate of inactivation. Storage tests with malonaldehyde showed that it undergoes decomposition which is dependent upon time, reagent concentration, and pH. Furthermore, the products of this decomposition are also capable of causing inactivation of the enzymes and the production of fluorescence. The nature of such products is not known.

The authors state that the biological significance of these reactions is difficult to assess. Because of the number of variables involved in the reactions, it appears that there are no simple solutions to the problem of the reactions of malonaldehyde or other products of oxidized lipids with proteins.

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[9 figures, 1 table, 15 references]

0.35 (0.38)

In all four species of sturgeon the peptides containing the active-site-lysine had identical primary structure; the other 18 residue peptides were found to be variable. In peptides from A. fulvescens and A. transmontanus position 29 is occupied by tyrosine. In the peptides of A. sturio and A. oxyrinchus the tyrosine is replaced by asparagine. Serine occupies position 31 of the peptide from A. fulvescens, but alanine occupies this position in the other three species. This variation in aldolase structure between species of sturgeon purified

This variation in aldolase structure between species of sturgeon surprised the authors; they believe that aldolase is a highly conserved protein. They concluded that the mutations of the alteration of amino-acid sequence is a rare event. They attribute these differences to early and lasting isolation of genetic populations. Further work on the aldolases of the species studied and other sturgeons may be expected to provide information, at the molecular level, on the evolution of species in general and the sturgeon in particular.

MS

1 figure, 8 references]

Harlmann, Thomas (Pharmakognostisches Inst., Univ. Bonn, Bonn, Germany, Chemical Abstracts 76, No. 17, 96313x (Apr. 24, 1972)

0.38

### 3. COENZYME SPECIFICITY AND ACTIVATION BY CARBOXYLIC COMPOUNDS

NEW POLYVALENT PROTEASE INHIBITORS FOR TRYPSIN, CHYMOTRYPSIN, PLASMIN, AND KALLIKREINS FROM SNAILS (*HELIIX POMATIA*)

Tschesche, Harald, Rudolf Marx, and Hans Fritze (Org.-Chem. Lab. Tech. Univ. Muenchen, Munich, Germany)

Chemical Abstracts 76, No. 21, 123391e (May 22, 1972)

211

[1 figure, 1 table, 15 references]

The authors found that, in the absence of any overt sign, offspring from mice exposed to methylmercury behaved significantly different from controls when tested for subtle deviations during postnatal development. They suggested that subtle parameters should be examined when assessing the risks of exposure to methylmercury--it is possible that people with minor symptoms or subclinical damage have gone undetected.

Science 177, No. 4049, 621-623 (Aug. 18, 1972)

Spyker, Joan M. (Departments of Anatomy and Pharmacology, University of Minnesota Medical School, Minneapolis, MN 55455), Sheldon B. Sparber, and Alan M. Gold-

0.35  
(9.19)

0.39

# GAMMA SPECTROMETRY OF MARINE ORGANISMS FROM THE WEST COAST OF INDIA

Unni, C. K., and R. Viswanathan (Health Phys. Div., Bhabha At. Res. Cent., Bombay, India)

Chemical Abstracts 77, No. 3, 16016k (July 17, 1972)

MS

[4 figures, 1 table, 28 references]

The intramolecular heterogeneity of eukaryotic (higher order species) nuclear DNA is shown by satellite and mainband DNAs which have characteristic buoyant densities, base composition, and reassociation rates.

Experiments on crab DNA were conducted in which satellite DNA separated electrophoretically from its main band DNA. It was observed that the crab satellite DNAs migrated electrophoretically slower on gels and have lower G-C content than their respective main band DNAs.

Experiments were performed to determine the relation between electrophoretic pattern and base composition of DNA by comparing the effects of nucleotide composition and molecular weight of microbial DNA on its electrophoretic migration in composite acrylamide-agarose gels. The results showed that the mobility of DNA in the gel is dependent in part on its base (or G-C) composition. Mobility of DNA is also affected by its molecular weight.



0.39 DE NOVO SYNTHESIS OF TRANSFER AND 5S RNA<sup>1f</sup> IN CLEAVING SEA URCHIN EMBRYOS

O'Melia, Anne F., and Claude A. Villee (Department of Biological Chemistry, Harvard Medical School, Boston, MA 02115; and Marine Biological Laboratory, Woods Hole, MA 02543)  
Nature New Biology 239, No. 89, 51-53 (Sept. 13, 1972)

Significant changes in RNA metabolism during early sea urchin development have been found. Until recently the only detectable class of RNA synthesized during cleavage stages was that with a low guanine-cytosine (G+C) base composition and heterogeneous sedimentation properties (DNA-like RNA) [under the action of a centrifugal field]. The genes for nucleolar ribosomal RNA (26S and 18S) [S = sedimentation characteristic or Svedberg unit] were believed to become active only following gastrulation [of the embryo], and the products of nuclear transfer RNA (4S) genes were first detected at the mesenchyme blastula stage.

Some concepts of RNA synthesis in cleaving sea urchin embryos are changing. The authors examined the possibility that the genes for nuclear ribosomal 5S RNA were active at this stage. Using the techniques of sucrose density gradient centrifugation, and reprecipitating RNA from the 4S region, and the sensitive refractioning by electrophoresis on polyacrylamide gels, several species of low molecular weight RNA were resolved. The authors believe this information demonstrates that the genes for ribosomal 5S and for tRNA (4S) RNAs are active in transcription [copying the genetic code] and are not repressed during cleavage stages of sea urchin embryo development.

[4 figures, 28 references]

SW

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0.4 CARCINOGENIC NITROSAMINES FORMED BY DRUG/NITRITE INTERACTIONS

Lijinsky, William (Biology Division, Oak Ridge National Laboratory, Oak Ridge, TE 37830), Evelyn Conrad, and Rosalie Van de Bogart (Eppley Institute for Cancer Research, University of Nebraska Medical Center, Omaha, NE 68105)  
Nature 239, No. 5368, 165-167 (Sept. 15, 1972)

Nitrosamines have broad carcinogenic activity in many animal species. Man may be exposed to nitrosamines formed in vivo from ingested nitrite and secondary amines; nitrite and several secondary amines are common in the diet. Tertiary amines can also react with nitrite in the mildly acid condition of the mammalian stomach; therefore drugs containing or consisting of tertiary nitrogen must also be considered.

Interaction of nitrite was studied with six tertiary compounds representative of different types of chemical structure found in food or drugs: oxytetracycline (antibiotic), aminopyrine (analgesic), disulfiram (antialcoholic), nikethamide (respiratory stimulant), tolazamide (oral hypoglycaemic), and piperine (found in pepper). All gave measurable yields of nitrosamine at body temperature.

The tertiary amines aminopyrine and oxytetracycline gave high yields of dimethylnitrosamine (DMN); however, reactions with the antibiotic showed a marked dependence on pH and nitrite concentration. The optimum pH was 3, and a lower yield of DMN was obtained at lower molar ratios of nitrite.

The dialkylamides, nikethamide, and disulfiram yielded diethylnitrosamine; and piperine yielded nitrosopiperidine. Formation of nitrosamine was favored at pH above 3.

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0.4 MOVEMENTS OF ECHINOCHROME GRANULES DURING THE EARLY DEVELOPMENT OF SEA URCHIN EGGS

Belanger, A. M., and R. C. Rustad (Marine Biological Laboratory, Woods Hole, MA 02543, and Department of Radiology, Case Western Reserve University, Cleveland, OH 44106)  
Nature New Biology 239, No. 90, 81-83 (Sept. 20, 1972)

Echinochrome (respiratory) pigment granules in unfertilized eggs of the sea urchin (*Arbacia punctulata*) undergo randomly directed saltatory [discontinuous-jumpy] movements. After fertilization nearly all these granules migrate to the egg cortex [the area beginning at the inner surface of the cell wall and extending inward] and become embedded. Subsequent movement of pigment granules may be due to mass cortical changes rather than independent granule movements. At the fourth cleavage, a quartet of micromeres [one of the smaller cells resulting from unequal segmentation of an egg] containing little or no pigment forms at the vegetal pole of the embryo. [The vegetal pole is the center of the protoplasm which gives rise to the hypoblast (innermost of three primary germ layers and source of the epithelium of the digestive tract and its derivatives). Abstractor's note] By the two or four cell stage, pigment granules have begun to move out of this region, leaving a "clear area" on each blastomere.

To investigate possible mechanisms of these movements and their relation to cortical events involved in fertilization, cleavage, and micromere formation, eggs were treated at critical stages with agents (such as colchicine, colcemid, or cytochalasin B) expected to prevent or alter pigment granule movements.

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0.5 (3.15)

POST-IRRADIATION EVALUATION OF PATHOGENS AND INDICATOR BACTERIA

Tiwari, N. P., and R. B. Maxcy (Department of Food Science & Technology, University of Nebraska, Lincoln, NE 68503)  
Journal of Food Science 37, No. 3, 485-487 (May-June 1972)

The purpose of this study was to determine the post-irradiation behavior of certain species of *Salmonella* and certain indicator organisms of public health significance.

Radurization of foods kills some bacteria and injures others. The injured cells are capable of growth in favorable environment but are not able to grow in the presence of inhibitory agents in selective media. Cells injured by radiation show sensitivity similar to cells injured by heat, freezing, or bactericidal treatment. The recovery of injured radurized cells on selective media may depend upon the nature of such media. Because the mechanism of recovery is not understood, we must evaluate the phenomena in terms of the influence of various food processing and storage operations to understand its significance in radurized foods.

The bacteria used were *Salmonella typhimurium*, *S. enteritidis*, *S. heidelberg*, and *S. senftenberg*, *Escherichia coli*, *Streptococcus faecalis*, and *Staphylococcus aureus*. A cobalt-60 source providing 17 Krad of gamma radiation per minute was used. Various nonselective and selective media were used appropriate to the organism examined. Infectivity of uninjured and injured cells was determined. Injured cells were considered those that were capable of growing on the most favorable growth medium (Plate Count Agar) but were not capable of growing on selective

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0.5 EXTENSIVE MICROBIAL DEGRADATION OF DDT IN VITRO AND DDT METABOLISM BY NATURAL COMMUNITIES

Pfaender, Frederic K., and Martin Alexander (Graduate Field of Microbiology and Laboratory of Soil Microbiology, Cornell University, Ithaca, NY 14850) Journal of Agricultural and Food Chemistry 20, No. 4, 842-846 (July-Aug. 1972)

D. D. Focht and M. Alexander (Science 170, 91 (1970)) demonstrated that DDM [bis(p-chlorophenyl)methane] could be degraded by a strain of Hydrogenomonas. DDM is a product of the microbial degradation of DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane]. The present study was carried out to determine whether this bacterium could metabolize the insecticide itself and cleave one or more of the compound's benzene rings. Also, the authors attempted to find out how the pesticide would be transformed in samples from natural ecosystems containing heterogeneous microbial communities.

Cell-free extracts of bacterium Hydrogenomonas sp. converted DDT to DDD [1,1-dichloro-2,2-bis(p-chlorophenyl)ethane], DDMS [1-chloro-2,2-bis(p-chlorophenyl)ethane], DDP [4,4'-dichlorobenzophenone], and several other products under anaerobic conditions. When whole cells and oxygen were subsequently added, p-chlorophenylacetic acid was formed. Thus, it was demonstrated that enzymes of a single bacterium can convert DDT to ring-cleavage products. A strain of Arthrobacter sp. grew on p-chlorophenylacetic acid, forming p-chlorophenylglycolaldehyde and other products. The action of two bacteria, then, can lead to biodegradation of DDT.

(over)

0.5 CLOSTRIDIUM BOTULINUM TYPE F: ISOLATION FROM VENISON JERKY

Midura, T. F., G. S. Nygaard, R. M. Wood, and H. L. Bodily (Microbial Diseases Laboratory, California State Department of Public Health, Berkeley, Calif.) Applied Microbiology 24, No. 2, 165-167 (Aug. 1972)

C. botulinum type F was first isolated by V. Moller and I. Scheibel [Acta. Pathol. Microbiol. Scand. 48, 80 (1960)] in 1958 from a home-prepared liver paste that was involved in an outbreak of human botulism on the Danish Island of Langeland. Subsequently, type F strains have been isolated from marine sediment from the Pacific Coast, salmon from the Columbia River, crabs from the eastern coast of the United States, and soil samples in Argentina. The first (and only) reported outbreak of botulism involving C. botulinum type F in the United States occurred in California in 1966. Home-prepared venison jerky was involved. Twenty people ate the jerky; 3 developed botulism, 2 developed mild gastro-enteritis, and 15 remained asymptomatic. The present paper describes the laboratory work performed in connection with the outbreak, describes the characteristics of the C. botulinum type F strain isolated, and compares this strain with that of the Langeland (Denmark) type F strain and a type E strain.

The isolate differed from the Langeland type F strain in being nonproteolytic. The authors note that neither the type F strain isolated from venison jerky nor the Langeland type F strain was water related. (Earlier work on the distribution of C. botulinum type F in nature suggests that it is in some manner related to salt-water or fresh-water environments.) In the outbreak described, neither the organism nor the toxin was detected in any of the ingredients used in the preparation of the venison jerky. Opportunity for contamination of the dressed venison had been present, and quite likely the soil was the probable source of the organism. [1 table, 16 references]

1.0152 A SURVEY OF THE FISHING INDUSTRY IN GOA (9.2)

Nalk, D. P., and M. R. Kulkarni (Directorate of Fisheries, Panaji, Goa, India) Published by Directorate of Fisheries, Government of Goa, Daman and Diu, Panaji, Goa, India (1970), 41 pp.

Goa is an independent state situated on the west coast of India about 300 miles south of Bombay. Estuaries formed by seven major rivers provide protective shelter for fishing boats.

This survey was made in 1966-1967 by interrogating 42% of the households engaged in the fisheries. The fishing season for all types of fish begins in September (at the end of the monsoon season) and lasts to the end of May. The busiest period in the season occurs from September to January upon the arrival of sardine and mackerel schools in shallow waters. There are five main fishing techniques employed in the marine fishery: beachseining, gill netting in off-shore waters, cast netting in shallow waters, hook-and-line fishing, and mechanized fishing. Of these the most important is beach seine or "rampon" fishing engaging 42% of the fishermen. Freedom from heavy surf and a smooth sea bottom are the coastal conditions that favor beach seine operations.

Inland fishing gear consist of the cast net, gill net, and stake net. Stake net fishing is carried on throughout the year. The right to a stake net site on a river must be purchased from the Government. Fish supplies are low in the monsoon season because marine fishing practically stops. Consequently, consumer demand brings high prices for fish caught in the rivers. However, the amount of fish caught in the rivers is relatively meager.

(over)

2.111 SPOOLING SYSTEM IMPROVES WIRE ROPE LIFE (2.1121)

Anonymous Australian Fisheries 31, No. 8, 30-31 (Aug. 1972)

The Lebus system of spooling control is achieved by grooves in the core of the trawl drum which guide the first layer of rope in a smooth pattern.

Figure 1 shows how the warps of rope are layered onto the grooved drum. Figure 2 shows how the groove is parallel to the drum flanges except for the two angled sections where the groove moves across the drum

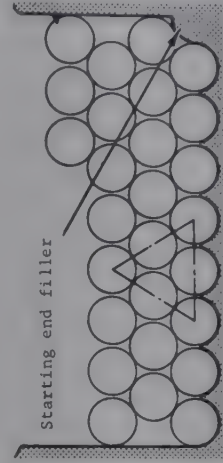


Fig. 1 (Reprinted)

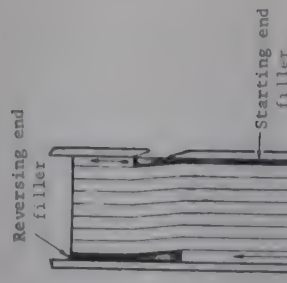


Fig. 2 (Reprinted)

VIBRIO PSYCHROERYTHRUS SP. N.: CLASSIFICATION OF THE PSYCHROPHILIC MARINE BACTERIUM, NRC 1004

0.5

D'Aoust, J. Y., and D. J. Kushner (Department of Biology, University of Ottawa, Ottawa, K1N 6N5, Ontario, Canada) Journal of Bacteriology 111, No. 2, 340-342 (Aug. 1972)

A red, motile, gram-negative, rod-shaped bacterium, formerly known as marine psychrophile NRC 1004, was classified as *Vibrio psychroerythrus* sp. n. The bacterium was originally isolated from flounder eggs by K. Eimhjellen of Trondheim, Norway. It is of special interest because it is an obligate psychrophile and because it has exacting salt requirements. It grows at 0° to 19° C. but dies and rapidly lyses at 21° C. or higher. The organism needs relatively high concentrations of Na<sup>+</sup> and Mg<sup>2+</sup> ions for stability. At one time the organism was thought to be related to the genus *Serratia*. The present work shows that the organism should be assigned to the genus *Vibrio*. [2 tables, 23 references]

FTP

Chemical Abstracts 76, No. 25, 150870s (June 19, 1972)

Duncan, Charles L., Dorothy H. Strong, Madeleine Sebald (Food Res. Inst., Univ. Wisconsin, Madison, Wis.)  
SPORULATION AND ENTEROTOXIN PRODUCTION BY MUTANTS OF *CLOSTRIDIUM PERFRINGENS*

0.5

Major metabolites formed by microbial communities of sewage and of fresh water containing sediment were DDD and DBP; small amounts of 1,1,1-trichloro-2,2,2-trichlorophenyl(ethylene) were formed but no *p*-chlorophenylacetic acid accumulated. When *p*-chlorophenylacetic acid was added to microbial communities of sewage, it was rapidly decomposed. [5 figures, 2 tables, 19 references]

ATL

Samples of 51 flounders and plaice were examined for salmonellae. *Salmonella typhimurium* was detected in 3 cases in the intestine and liver and in one case *S. manchester* was detected in the bile. C.S.B.  
Wuthe, H. H., and G. Findel Arch. Lebensmittelhyg. 23, No. 5, 110-111 (1972) (In German)  
BMRBA Abstracts 25, No. 8, Abstract No. 2863, 574 (Aug. 1972)

0.5 SALMONELLAE IN FLAT FISH IN COASTAL WATERS

2.111 (2.1121)

one-half pitch to give a full pitch of movement per revolution.

Two important requirements that govern applicability of the system are the fleet angle and the need for adequate tension at all times to ensure that the rope will stay tightly in its position. To obtain a perfect winding pattern the fleet angle (shown in Figure 3) should be kept between a maximum varying from 1-1/4° and 1-3/4°, and a minimum of 1/4°, according to operating conditions.

In addition to increasing rope life, the system is said to reduce labor and maintenance costs. [3 figures, 2 photographs]

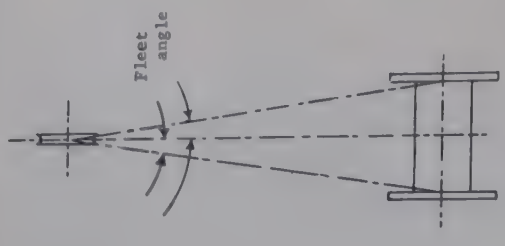


Fig. 3 (Reprinted) SW

1.0152 (9.2)

The Government is encouraging fish culture as a source of food. Carp are being raised in demonstration ponds with good results. Indigenous fishing craft are dugout canoes of under 1-ton capacity, and plank-built boats, with an outrigger, of over 3-ton capacity. There are 3,595 nonmechanized boats in Goa.

The major part of fish production consists of mackerel and sardine. The total catch of all marine species in 1968 was 18,888 tons. Estimate of the total river stake net catch is 3,000 tons annually. Most of the catch is consumed locally in fresh condition. Surplus mackerel and sardine are dry salt cured. There are four canning plants which operate only in the mackerel-sardine catching season. Cold storage plants have become available for quick freezing and storing fish. Development of a frozen fish (shrimp) export trade is foreseen.

The Government has increased funds allocated for the development of the fisheries including training programs, exploratory fishing, ice factory and cold-storage plant building, fish culture, fishery research and statistics, fish markets, and subsidies to cooperatives in purchases of mechanized boats and fishing supplies. The Government has promoted the mechanization of boats because they can be used in deep-sea fishing to increase the total catch and to keep the canneries busy in lean years. Mechanized boats can be used either for purse seine or trawl fishing. In 1969, two mechanized purse seiners caught 471,946 kilograms of mackerel and sardines. There were 31 mechanized boats in Goa in 1969.

Increased mechanization of boats, more ice plants and frozen storage facilities, and increase in the use of canning facilities are expected to influence the expansion of the Goan fisheries. [see 10 tables]

MS



Anonymous

Fishing News International 11, No. 8, 43, 46, 49 (Aug. 1972)

More fishermen from British Columbia, Canada, use the drum seine than the conventional power block seine. Many Washington State boats are equipped to fish with either seine.

The advantages of the drum seine lie in the fewer crew members needed (four compared to seven required for a block seine); the larger number of sets per day that can be made (17 sets compared to 10 for a block seiner), and flexibility. The components of a drum seine are as follows. The corkline is a line fitted with floats, which supports the "up-side" of the net and prevents it from sinking. The headline is a weighted line that pulls the "down side" of the net into position causing it to become a curtain between the corkline and the headline. Beneath the headline bridles position and support rings through which the purse line runs freely. A bunt, or fish bag, or sock is located at one end of the net and is made of heavy webbing to support the massed catch.

Both ends of a block seine are shaped the same, the central part of the net being deepest, with a slight taper towards both ends. A drum seine is sharply tapered at the towing or wing end of the net. The headline and the corkline thus come together at a single point and are fastened to a towline; the towline is wrapped on the drum. The first purse ring will be about 30 fathoms away from the towing end of the net; that section of the net cannot be pursed. The purse line is hung in the rings in several sections, with a swivel at each section. This arrangement permits the net to be partially pursed at any of several points during the retrieving portion of the set. (over)

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Anonymous

Fish Boat 17, No. 8, 28-29 (Aug. 1972)

Early radio transmissions occupied wide bands on the radio frequency spectrum; consequently, as the number of transmitters increased in an area, interference between them also increased. The need then and now has been for highly selective, narrow band transmissions to reduce interference and to permit an increase in the number of broadcasting stations on the dial.

A common method of radio communication is through the transmission of a carrier frequency; to convey a message the carrier is modulated by voice or other signals. The carrier frequency radiates continuously whether it is modulated or not. In addition to the carrier frequency two sidebands are unavoidably radiated in the transmissions. Sidebands are radiations above or below the accompanying carrier frequency. This method is called amplitude modulation (AM) or double sideband, and it is wasteful of valuable spectrum space.

The single sideband system (SSB) has been developed from the AM system; the carrier and the other sideband have been eliminated by filters. Thus the SSB transmission occupies the narrowest possible space on the dial. Furthermore, power is used more economically. The SSB does not radiate until a signal is impressed on the system. The SSB receiver is highly selective thereby keeping out unwanted noise. The SSB system must be kept in exact adjustment to transmit signals in a narrow band. If it is slightly out of adjustment, transmissions will radiate out of the narrow band and cause interference in other channels. [3 figures]

SW

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Smoler, David E. (Harnett Marketing, Inc.)

Fish Boat 17, No. 8, 31 (Aug. 1972)

Shore-based loran transmitting stations emit short pulses of radio frequency. They are emitted from a master or reference station and from a slave station at a different geographical location. The pulses are synchronized so that there is a fixed time delay between pulses from each station. The relative time for a pulse to arrive is measured and indicated by the loran receiving equipment. A time difference is converted into a reading in miles. From special tables prepared for the pair of loran stations involved, the line of position of the boat is determined. Similar observations made on a second pair of loran stations yield a second line of position; the intersection of the two lines establishes the position of a boat. Measuring of the relative times of arrival of the pulses is accomplished by matching the wave form of the pulse envelopes displayed on the face of a cathode ray tube through adjustment of calibrated time-delay controls.

These manual adjustments have been eliminated in an improved loran receiver which automatically matches the pulse to find the time-delay. The result is displayed in digital form. This new loran receiver is also more reliable because of use of integrated circuits and other refinements.

The author suggests that navigation is easiest when two automatic tracking receivers are used. With each turned to a different pair of stations, position is always known. In this manner a constant heading can be maintained during a drag in spite of wind or current influences. In addition, repeaters placed in strategic locations as at the wheel, flying bridge, or winch can free a man for additional (over)

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(2.1146)

Masucci, Joseph E. (Benmar Division, Computer Equipment Corp., Santa Ana, Calif.)  
Fish Boat 17, No. 8, 30, 57-58 (Aug. 1972)

The conventional depth recorder has a mechanical scanning system which consists of a motor-driven stylus rotating in contact with recording paper which changes color by burns from electrodischarge. The signals reflected from a target are received, amplified, and applied to the stylus. The color of the paper changes at the points where the stylus was in contact when the echo signals were applied.

In this system the rotating speed of the stylus must be increased as the distance to the target decreases. A depth recorder that operates most of the time for shallow water must have a stylus rotating at higher r.p.m. (revolutions per minute) than one operating over deeper water.

There is a practical limit to the r.p.m. of a motor in a depth recorder cabinet. Another limiting factor is that two or more different echos cannot be recorded simultaneously.

The new multistylus depth recorder solves these problems. The styli are stationary and not subject to mechanical failure. The train of styli is electronically scanned at varying speeds to permit instantaneous recording, including recording objects near the surface. High accuracy is another important advantage which permits monitoring of expensive nets on the bottom to provide for position adjustments in preventing damage by changes in terrain.

The reference point of the scanning system is the seabed; since the machine can record more than one signal simultaneously, fishermen can see expanded recordings of fish on or near the bottom. These signals show up at a constant width (over)

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## 2.116 AUTOMATIC PILOTS FOR THE FISHING FLEET

Campbell, William F., Jr. (Energy Control Corp., Bellevue, Wash.)  
Fish Boat 17, No. 8, 33, 61-63 (Aug. 1972)

The automatic pilot is comparable to the helmsman of a boat. He watches the boat's binnacle, keeping the boat on the desired course by turning the wheel to adjust the rudder setting when the binnacle indicates that the boat is off course. The rudder adjustment will turn the boat back to the proper course. As the binnacle indicates that the boat is coming back to course the helmsman returns the rudder to "dead ahead" by turning the wheel. The helmsman continues to watch the binnacle and will make adjustments to the rudder to maintain the desired course whenever necessary. Furthermore, the experienced helmsman is aware of sea conditions; rather than try to hold a precise heading in heavy seas, he tries for an average course, allowing the bow to work back and forth across the desired heading.

An autopilot works in a manner similar to the helmsman; it senses the heading it has been set to maintain and transmits signals to the rudder actuator control to maintain the required position. If the autopilot senses an off course condition, signals will be transmitted to rudder control to make adjustments that will return the boat to the desired heading. Feedback signals from a position sensing device on the rudder cause the autopilot to sense that the rudder is in the required position.

An autopilot should have a boat speed control. The amount of rudder movement is related to boat speed since more rudder movement is required at low speed and less movement at higher speeds. In addition, in following seas, rudder requirements are usually different than in other headings. In this condition more rudder (over)

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## 2.3 BETTER UTILIZATION OF FISHERY PRODUCTS THROUGH IMPROVED AND (2.15) NEW HANDLING AND PROCESSING CONCEPTS

Groninger, Herman S., Jr. (Pacific Fishery Products Technology Center, National Marine Fisheries Service, NOAA, 2725 Montlake Blvd. East, Seattle, WA 98102)  
Journal of Milk and Food Technology 35, No. 8, 479-481 (Aug. 1972)

Refrigerated sea water (RSW) has been used as a medium for chilling whole fish at sea and at processing plants ashore. Addition of CO<sub>2</sub> to RSW increased storage life of chum salmon and rockfish by at least 1 week.

The commercial picking of cooked crab and the flotation procedure for separating shell and tendon from crabmeat are hand operations. Up to 15-20% of crab waste can be recovered as crabmeat through use of a centrifuge. Chopped crab was prepared in a saturated brine slurry and fed into a centrifuge. In all instances, the meat was separated from shell and tendon; and the shell was free from meat.

A laboratory model of a Japanese deboner was studied. The machine separated fish flesh from skin and bone. The yield of flesh was high in proportion to the whole body and was in minced form, which suggests the possibility that underutilized species of fish can be used for food preparations such as fish sticks and fish sausage. [4 references] SW

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## 2.9 NITRITES IN TROUBLE

Anonymous  
Nature 239, No. 5367, 63-64 (Sept. 8, 1972)

The possibility that nitrites may combine in the stomach with amines and amides to form highly carcinogenic nitrosamines is cause for growing concern. The reaction between these substances occurs readily in test tubes. Agents of the Food and Drug Administration (FDA) argued that the low levels of nitrite permitted by regulation are not known to combine with amines in the stomach; furthermore, secondary and tertiary amines are rarely found in nature. However these amines are in many widely used drugs, including the antibiotic oxytetracycline; a drug used by diabetics, tolazamide; and the drug used to control alcoholism, disulfuram. The results of tests in which mice were fed mixtures of nitrites and amine-containing drugs show that tumors were produced.

Critics of the policies of the FDA charge that regulation of nitrites in foods are too lax. A congressional subcommittee charges that the 200 p.p.m. limit set in 1925 by the Department of Agriculture (USDA), and continued ever since, is without scientific justification.

A major issue is based on an apparent contradiction. In regulating chub fish curing, FDA required a minimum of 100 p.p.m. of nitrites; no lower limit had been set for meat. A lawsuit has been opened based on the contention that USDA licensed use of nitrites as a curing agent, not as a preservative, which the FDA minimum requirement in fish indicates. Therefore the argument continues, nitrites (as (over)

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## 3.2497 TIME-TEMPERATURE INDICATING SYSTEM "WRITES" STATUS OF PRODUCT SHELF LIFE

Hu, Kwoh H. (Engineering Sciences Div., General Equipment & Packaging Laboratory, U.S. Army Natick Laboratories, Natick, MA 01760)  
Food Technology 26, No. 8, 56-58, 60, 62 (Aug. 1972)

This article describes the theoretical basis for and the development of a time-temperature indicating system that provides information related to product shelf life. The system is based on the concept that the shelf life of a product and the permeation of a fixed quantity of oxygen through a plastic film vary with temperature in a similar manner. The device consists of an oxygen-reacting chemical system in a plastic pouch; the amount of reaction that takes place between the chemical and oxygen depends upon the amount of oxygen that permeates the plastic film. The amount of oxygen permeating the film (thus the amount available to react with the chemical) depends upon the exposure time and temperature. In actual practice the device can be attached to the exterior of the food container or placed in the area where the foods are stored.

The chemical system used was a solution of sodium anthraquinone 8-sulfonate and zinc dust dissolved in aqueous alkali. This solution is blood-red in color and is opaque. On exposure to air the solution turns colorless and becomes clear. In practice, a written message is included in the sealed plastic pouch containing the opaque red solution. When the solution becomes oxidized in storage (at a rate depending upon the time and temperature) the solution becomes colorless and clear and the message becomes visible. A multistage indicating system can be achieved (over)

COMMERCIAL FISHERIES ABSTRACTS VOL 25 NO 12 PAGE 11

# THE PRESERVATION OF FISH

2.9

preservatives) are not exempt from the Food and Drug Act as are other additives approved before the Act came into force. The argument is complicated in that nitrates may prevent the growth of the causative agent of botulism in addition to their ability to impart red color to meats.

Not all cured products need nitrates to control growth of the causative agent of botulism. Bacon is cooked at temperatures that destroy the spores and toxin of the organism. There is doubt also, of suitability of some cured meats as cultures media for spore formation. The critics argue that where nitrates are not necessary to prevent hazard of botulism, FDA should more strictly regulate their use.

The FDA contention holds that until the hazard can be proved, use of nitrates should continue. The critics reply that if there is a risk of cancer nitrates should be strictly regulated until no risk is proven.

SW

3.8 TREATMENT OF PICKLED [FISH] MEAT WITH FAT CONTAINING GLYCEROL ALIPHATIC ACID ESTERS

Matsumoto, Shoji, Akiji Miyakawa (Riken Vitamin Oil Co., Ltd.) (pat.)  
Japanese Patent 18582/71 (May 24, 1971)  
Chemical Abstracts 72, No. 5, 33123k (July 31, 1972)

TREATMENT OF PICKLED [FISH] MEAT WITH FAT CONTAINING



3.337  
(3.338)(0.8)

ENGINEERING CONSIDERATIONS IN RETORT PROCESSING  
OF FLEXIBLE PACKAGES

Davis, R. B., F. E. Long, and W. F. Robertson (Continental Can Co., Inc., 1200 W. 76th St., Chicago, IL 60620)  
Food Technology 26, No. 8, 65-68 (Aug. 1972)

This article is a discussion of the engineering aspects related to the retort processing of foods in flexible pouches. The pouch used in recent experimental work consisted of a 1/2-mil polyester x 1/3-mil aluminum foil x 3-mil C-79 polyolefin structure. The film has a seal strength greater than 6,000 g./in. of width at room temperature and will maintain about 1,500 g./in. of width at a retort temperature of 250° F. The 3-side-sealed pouch is placed in a vacuum chamber and the food product is introduced into the open end. Vacuum is drawn in the chamber and the open end of the pouch is sealed. Impulse heat sealing is used, rather than conventional heat sealing, because it can overcome some of the adverse effects resulting from contamination of the seal. Because the heat seal strengths of the pouch are reduced at retort processing temperatures, it is necessary to process them with superimposed air pressure to protect the seals and to prevent rupturing of the pouch during heat processing and cooling.

Although many of the engineering aspects are yet to be developed for commercial application with high-speed, high-volume units, the engineering know-how is available in the United States. Retort pouch packaged and processed foods have many advantages as follows: (1) The foods have high quality, flavor, color, and texture because they are processed a shorter time; (2) the packaged foods do not

(over)

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4.1  
SEASONAL VARIATIONS IN THE CHEMICAL COMPOSITION  
OF CORNISH MACKEREL, *SCOMBER SCOMBRUS* (L.),  
WITH DETAILED REFERENCE TO THE LIPIDS

Hardy, R., and J. N. Keay (Torry Research Station, Aberdeen, Scotland)  
Journal of Food Technology 7, No. 2, 125-137 (June 1972)

Previous work has shown that lipid content of fish is subject to variation depending on food supply, other environmental influences, and season.

Proximate analyses and determinations of lipids were performed on monthly samples of mackerel caught off the Cornish coast through a period of 1 year (December 1968-November 1969).

Maximum and minimum total-lipid levels were recorded in December and June, respectively. The highest mean lipid unsaturation levels were recorded in November and the lowest in May. An inverse linear relationship was observed between lipid and water content with protein level remaining constant.

The lower lipid content occurs prior to and during the spawning period (March to July). Depletion of fat resources prior to spawning also occurs since, in many species of fish, mobilization of fat accompanies gametogenesis.

The free fatty composition of the lipids contained substantial proportions of long chain fatty acids many of which were highly unsaturated. There was a low level of the 20:1 acid--less than 10%.

The reasons why aquatic organisms require, store, and utilize such highly unsaturated fatty acids is not clear. The authors suggest the overriding requirement is that of maintaining fluidity of the extracellular lipids at lower

(over)

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6.19

NUTRITIONAL REPORTS ON THE ANNUAL MEETING OF THE  
POULTRY SCIENCE ASSN. PART I: LAYING HEN NUTRITION

Couch, J. R. (Department of Poultry Science, Texas A & M University, College Station, TX 77840)  
Feedstuffs 44, No. 40, 28, 29-32 (Sept. 25, 1972)

The meeting was held August 7-11, 1972, in Columbus, Ohio. The author grouped 110 papers presented at the meeting into subjects for his report.

Losses from poor eggshell quality are troublesome to the industry. Calcium source is not a factor. A combination of pulverized and selected particle sizes is the best supplement. The guide level of calcium supplements vary: 3.5-3.7% in early stages of production and mild temperatures; 3.75-4% in hot weather. Calcium in excess of 4.5% results in decreased egg production and feed conversion.

Phosphorus in hen diets exceeding 0.7% results in a decrease in performance and a detrimental effect on eggshell thickness. Hens can utilize phytin phosphorus. Antibiotics were found to assist the hens in overcoming stress of abrupt changes in temperature, or prolonged high temperatures, and other types of stress. The broad spectrum antibiotics can be used intermittently, under regulations, with FDA approval. West Germany has approved continuous use of bacitracin in laying hen diets.

A deficiency of sodium chloride was shown to produce a reduction in egg production, decrease feed consumption, and decrease egg size. If the diet does not contain animal protein such as fish meal and bone scraps, the sodium chloride level in the feed should be checked. The requirement for the laying hen is listed as 0.15% sodium equivalent to 0.37% sodium chloride.

(over)

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6.54  
CRACKERS FORTIFIED WITH FISH PROTEIN CONCENTRATE (FPC)

Sidwell, Virginia D., and Bruce R. Stillings (College Park Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, College Park, MD 20740)  
Journal of the American Dietetic Association 61, No. 3, 276-280 (Sept. 1972)

Two experiments were carried out to determine the nutritional quality, sensory qualities, and physical characteristics of crackers containing varying amounts of FPC. Saltine crackers were made according to a formulation used commercially. The test samples were made by replacing 4, 8, 10, 12, or 16% of the flour in the formulation with FPC. The FPC used was made by isopropyl extraction of red hake

(Urophycis chuss) according to a method developed at the Natural Marine Fisheries Service. Chemical analyses of the crackers were made for protein, volatiles, ash, fat, and various (10) amino acids; sensory evaluations were made for color difference, texture, and appearance; and nutritive evaluations [protein efficiency ratio (PER)] were made by rat feeding studies.

With each increment of FPC the protein content of the crackers increased by about 2 to 3% (the protein content of the unfortified crackers was 9.4%; that for the crackers fortified with 4% FPC was 12.0%). Fortification of crackers with FPC markedly increased the arginine, lysine, methionine, and threonine content of the crackers. The PER value of the crackers containing 4% FPC was three times that for the crackers with no FPC. The PER value for crackers containing 8% FPC was four times more than that for the crackers with no FPC.

The texture of crackers fortified with 4% or with 8% FPC was as acceptable as that of the unfortified crackers, but the texture of crackers containing 12% or 16%

(over)

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6.19 SALT CONTENT OF BASIC PROTEIN FEEDS OF ANIMAL ORIGIN AND POULTRY FEEDS

Bodnar, Magdolna (Orsz. Allategeszegugyl Intez., Budapest, Hungary)  
Chemical Abstracts 76, No. 25, 152304j (June 19, 1972)

3.330 CANNED FISH PRODUCT

Kyowa Hakkō Kogyō Co. Ltd. (pat.)  
Japanese Patent 10984/72  
Food Technology 26, No. 8, 96 (Aug. 1972)

Raw fish meat is treated with dipicollic acids before canning. The acids raise the coagulation temperature of the fish protein and reduce the amount of curd in the canned product.

MS  
The firmness of the cracker (as determined by a shear test) increased in the fortified cracker up to 12% fortification with FPC, but it decreased at the 16% level (nevertheless, the shear value at the 16% level was still higher than that of the unfortified cracker).  
The crackers became progressively darker with each increment of FPC. There were no off-flavors in the unfortified crackers and in the crackers containing 0.4, 4, or 8% added FPC after the crackers were stored for 161 days at 72°, 90°, 108°, and 126° F.  
[1 figure, 4 tables, 8 references]

61.9

6.54 FISH PROTEIN PREPARATIONS

Krassowska Szacillo, Teresa, and Aleksander Stala (Morski Instytut Rybacki) (pat.)  
German Offen. (patent) 2,143,277 (Mar. 2, 1972)  
Chemical Abstracts 77, No. 3, 18404j (July 17, 1972)

4.6 ROLE OF LIPID ANTIOXIDANTS IN MANIFESTATION OF SOME PHYSIOLOGICAL FEATURES IN FISH

Chernyshev, V. I., S. M. Yakubov, Yu. P. Kozlov, and B. N. Tarusov (Mosk. Gos. Univ. im. Lomonosova, Moscow, U.S.S.R.)  
Chemical Abstracts 76, No. 25, 151256h (June 19, 1972)

(8.0) (86C3) LEC.3

DLF

[abstract 2, figures 5]

References were cited, and the authors wish to supply a bibliography. The authors have found that the protein content of eggs or tissues. Neither selenium nor vitamin A affected egg production, egg weight, body weight, and mortality. Other studies showed the protein requirement of 15% to be adequate; the hen can tolerate and utilize laying diets which vary widely in energy content. Fatty liver syndrome continues to be a problem in the industry. Vitamin B12 and choline in the laying hen feed formula increased production and reduced liver fat.

Other temperatures. The aquatic organisms were always just below the mean temperature of the environmental water. Unsaturated lipids with their low melting points may be a means of keeping protoplasmic viscosity within the range of normal metabolic processes.  
[2 figures, 2 tables, 9 references]

75.9

1.7



De Lumen, B. O., and A. L. Tappel (Department of Food Science and Technology, University of California, Davis, CA 95616)  
Analytical Biochemistry **48**, No. 2, 378-385 (Aug. 1972)

[Lysosomes are subcellular organelles which contain digestive enzymes (cathepsins) capable of breaking down many of the cellular constituents. Disruption of the lysosomes and liberation of these enzymes may occur under certain conditions and can lead to lysis of the cell. A cathepsin is any one of several proteolytic enzymes present in tissue or cells. Ref. The Encyclopedia of Biochemistry, Eds. Williams and Lansford, Reinhold, N.Y. (1967). Abstractor's note.]  
Cathepsin B was originally defined by its amidase activity on benzoylarginine amide (BAA). The same activity had been demonstrated on benzoylarginine  $\beta$ -naphthylamide (BANA).

The  $\beta$ -naphthylamine released during hydrolysis of BANA has been measured colorimetrically by methods that are inconvenient and require attention to details. Work on the hydrolysis of BAA by colorimetric and microdiffusion methods is also in convenient and tedious. This study shows the conversion of the colorimetric BANA assay to a continuous fluorometric procedure for measurement of cathepsin B activity. The method is rapid, meets the requirement for a valid enzyme assay, lends itself to kinetic measurements, and is more sensitive than the colorimetric BANA or BAA assays.

The enzyme that hydrolyses BANA was found to be different from previously reported cathepsin B activities and is called BANA amidohydrolase.

(over)

9.12 FREE FLOATING MUCUS WEBS: A NOVEL FEEDING ADAPTATION  
FOR THE OPEN OCEAN

Gilmer, Ronald W. (Department of Zoology, University of California, Davis, CA 95616)  
Science **176**, No. 4040, 1239-1240 (June 16, 1972)

During the fall of 1971, the author made field observations, using scuba techniques, of the highly modified planktonic gastropods *Gleba cordata* (Forsk.) and *Corolla spectabilis* (Dall), in the order Thecosomata, in the surface waters of the Florida Current west of Bimini, British West Indies. The data in this article represent the first observations on live members of the order Pseudothecosomata, the first report of *Gleba* in the Florida Current, and the first record of adults of *Gleba* in any part of the tropical Atlantic. The biology of these organisms is obscure, because of their extreme fragility and unknown swimming abilities, previous expeditions have collected only a few badly damaged specimens.

These observations revealed that *G. cordata* and *C. spectabilis* use a free and unsupported mucus web for collecting food particles. The *Gleba* and *Corolla* are extremely rapid swimmers; they have escape speeds of at least 45 cm./sec. The author notes that their delicate bodies, quick reactions, and apparent abundance suggest that traditional plankton-sampling methods may be inadequate to assess their importance in the blue-water plankton communities. Figure 1 shows *G. cordata* as it appears while motionless in the water; figure 2 shows *C. spectabilis* swimming toward the surface of a tank in the laboratory; and figure 3 shows *G. cordata* feeding from its delicate mucus web at a depth of 20 m. in the Florida Current.

FTP

## 9.12 (9.13)

BIOLUMINESCENCE IN THE MARINE TELEOST, *PORICHTHYS NOTATUS*,  
AND ITS INDUCTION IN A NON-LUMINOUS FORM BY *CYPRIDINA*  
(OSTRACOD) LUCIFERIN

Tsuji, F. I. (Department of Biophysics and Microbiology, University of Pittsburgh, Pittsburgh, PA 15213), A. T. Barnes, and J. F. Case (Department of Biological Sciences, Marine Science Institute, University of California, Santa Barbara, CA 93106)  
Nature **237**, No. 5357, 515-516 (June 30, 1972)

The midshipman fish *Porichthys notatus* (occurs along the Pacific Coast from Alaska to Baja Calif., Mexico) has over 700 small dermal photophores arranged in rows over the surface of its body. Except for the fish from Puget Sound, the photophores of these fish luminesce during courtship. Luminescence is caused by the emission of light following a luciferase-catalyzed oxidation of luciferin by molecular oxygen. Inasmuch as the luciferin from *Porichthys* and luciferase reciprocally cross react to give light with luciferin and luciferase with the marine ostracod crustacean *Cypridina*, the authors carried out tests to determine whether the *Porichthys* might obtain elements of its luminescent system from its diet. They found that a nonluminescent specimen of *P. notatus* (from Puget Sound) became luminescent in response to oral administration or intraperitoneal injection of the luciferin from the *Cypridina*. From this observation they concluded that the deficiency in a *P. notatus* specimen may be of a dietary consequence. Additional experiments are being conducted to determine the mechanisms responsible and the ecological implications of the phenomenon.

FTP

## 9.12 HAWAIIAN-CAUGHT SKIPJACK TUNA AND THEIR PHYSICAL ENVIRONMENT

Seckel, Gunter R. (National Marine Fisheries Service, Pacific Environmental Group, Monterey, CA 93940)  
Fishery Bulletin **70**, No. 3, 763-787 (July 1972)

Empirical associations between the occurrence of skipjack tuna (*Katsuwonus pelamis*) in Hawaiian waters and environmental conditions point to the current system as an important cause for the variations in the Hawaiian fishery. Large inter-year differences of sea-air interactions in the skipjack spawning areas may affect larval survival and year-class strength. A numerical drift model was used to investigate the contribution of currents to the travel of skipjack from the eastern North Pacific to Hawaii. Floating objects introduced in the model ocean at long 120°W and lat 10° to 20°N converge toward the northern edge of the North Equatorial Current near Hawaii in 21 to 23 months. The time of freedom of skipjack tagged in the eastern North Pacific and recovered in Hawaiian waters is of the same magnitude. It is concluded that for skipjack a possible mode of travel from the eastern North Pacific to Hawaii is drifting in the North Equatorial Current. The variability in abundance and size-frequency distributions observed in the Hawaiian fishery can be caused by changes in the current system. Numerical models of the type presented can be verified and so permit progress from the exploratory to the experimental phase in fisheries investigations.

Author's abstract

[17 figures, 7 tables, 39 references]

9.12

# VARIATIONS IN SIZE AND LENGTH COMPOSITION OF ATLANTIC MENHADEN GROUPINGS

June, Fred C. (Bureau of Sport Fisheries and Wildlife, North Central Reservoir Investigations, P.O. Box 698, Pierre, SD 57501)  
Fishery Bulletin 70, No. 3, 699-713 (July 1972)

This paper gives estimates of size (weight) and length composition of summer schools and fall school-aggregations of Atlantic menhaden based on single-set purse-seine catches and accompanying catch samples obtained in 1955-62. The data show that the fish school by length and the average size of summer schools decreases as the apparent abundance of fish in a given area of the coast decreases. The significance of the school concept in the study of the dynamics of the population and the effects of fishing upon it are discussed, and additional avenues of research are suggested.

[13 figures, 3 tables, 25 references] Author's abstract

## 9.1 ENDOCRINE REGULATION OF GAMETOGENESIS AND GONAD MATURATION IN FISHES

Dodd, J. M. (Dep. Zool., Univ. Coll. North Wales, Bangor, Caernarvonshire, Wales)  
Chemical Abstracts 77, No. 3, 16770b (July 17, 1972)

9.21

# SEX DIFFERENCES IN ELECTRIC SIGNALING IN AN ELECTRIC FISH

Hopkins, Carl D. (Rockefeller University, New York, NY 10021)  
Science 176, No. 4038, 1035-1037 (June 2, 1972)

Gymnotid fish (of Central and South America) have specialized organs for the production and reception of electric currents. These organs function as an active sensory system for locating conducting and nonconducting objects in the environment; also, they may be used for intraspecific communication. This study explored the role of electric signals in the reproductive behavior of gymnotids. The study was carried out in the Rupununi District of Guyana, South America, with the fish *Sternopygus macrurus*. The *Sternopygus* produces tone discharges of highly stable frequency and which are nearly as long as the period between discharges.

The author found that the electric discharge of *S. macrurus* is distinctly different from the electric discharges of 10 sympatric species of electric fish in Guyana. The *Sternopygus* show different electric discharges between the males and females; they differ in their steady-state frequency of their discharges. Males produce variations in their electric discharge during courtship. Apparently, the differences in electric discharges shown by different species and by different sexes have communicative significance.

[2 figures, 17 references]

JLP

## EVIDENCE THAT PACIFIC OCEAN PERCH (SEBASTES ALUTUS) IN QUEEN CHARLOTTE SOUND FORM AGGREGATIONS THAT HAVE DIFFERENT BIOLOGICAL CHARACTERISTICS

Gunderson, Donald R. (Washington State Department of Fisheries, Fisheries Center, University of Washington, Seattle, WA 98105)  
Journal of the Fisheries Research Board of Canada 29, No. 7, 1061-1070 (July 1972)

Certain fish (anchovy, tuna, bream, kilka, roach, ocean perch, cod, and hering) aggregate by size. These aggregations might result from hydrodynamic differences between the individuals (large fish can swim faster and longer than small fish), but some workers believe that there are still other biological differences between aggregations. This paper gives evidence that Pacific ocean perch (*Sebastes alutus*) stock in Queen Charlotte Sound is subdivided into aggregations of similar-sized fish, and that the aggregations differ in biological characteristics other than length. Market samples of the Pacific ocean perch showed considerable variation in mean length, even when narrowly defined month-depth strata were considered. Also there was considerable between-sample variability in growth. There appears to be a tendency, then, for the species to form distinct aggregations, each with different biological characteristics.

[9 figures, 6 tables, 15 references]

## 9.1 TELEOST CAUDAL NEUROSECRETORY SYSTEM. SPERM DUCT CONTRACTION INDUCED BY UROPHYSIAL MATERIAL

Berlind, A. (Dep. Zool., Univ. California, Berkeley, Calif.)  
Chemical Abstracts 76, No. 21, 122063f (May 22, 1972)

This method measures the amount of 8-naphthyl-amine released when VANAB is split by a cathepsin B-like enzyme occurring in rat liver lysosomes. Incubation of the enzyme and substrate is at pH 7.0-7.2 in the presence of sulphydryl compounds (glutathione or dithioerythritol). The presence of the sulphydryl compound is an absolute requirement. The fluorescence is measured at 504 mμ emission with excitation at 345 mμ.

This assay, while not replacing the VANAB assay, should serve as an additional tool for studying lysosomal cathepsins.

[7 figures, 21 references]

7.59

## IDENTIFICATION OF POISONOUS SUBSTANCES IN DEAD FISH. II. DETECTION AND DETERMINATION OF PENTACHLOROPHENOL FROM FISH EXTRACT

Tokunaga, Seigo (Fukuoka Prefect. Police Headquarters, Fukuoka, Japan)  
Chemical Abstracts 77, No. 3, 18157f (July 17, 1972)



9.12 CONSIDERATIONS OF THREE PROPOSED MODELS OF THE MIGRATION OF YOUNG SKIPJACK TUNA (KATSUWONUS PELAMIS) INTO THE EASTERN PACIFIC OCEAN

Williams, F. (Institute of Marine Resources, Scripps Institution of Oceanography, University of California at San Diego, P.O. Box 109, La Jolla, CA 92037) Fishery Bulletin 70, No. 3, 741-762 (July 1972)

Previous evidence suggested that most exploited skipjack tuna (Katsuwonus pelamis) in the eastern Pacific Ocean have a central Pacific spawning origin. Three models are now proposed of the migration of young skipjack into eastern Pacific fishery areas; these are (i) the active migration model, (ii) the passive migration model, and (iii) the gyral migration model. Data utilized and theories advanced in the detailed development of the models are discussed. Mechanisms and timing in all three migration models are dependent on oceanographic conditions and events in the central-east Pacific, which thus have a controlling effect on migration success of incoming young fish. Current skipjack research cruises, in part designed to test the validity of the models, are outlined. Author's abstract [7 figures, 83 references]

9.13 THE METABOLISM OF NEUTRAL LIPIDS IN THE SPUR DOGFISH, SQUALUS ACANTHIAS

Sargent, J. R., R. R. Gatten, and R. McIntosh (Institute of Marine Biochemistry Natural Environment Research Council, St. Fittick's Road, Aberdeen, Scotland) Lipids 7, No. 4, 240-245 (Apr. 1972)

This study dealt with the roles of the different tissues of the spur dogfish (S. acanthias) in lipid metabolism and the mechanisms whereby lipid metabolism in the different tissues is correlated. These studies of the cell free fractions of the tissues showed that the liver and the intestine are the major sites of synthesis of triacyl glycerols. Wax esters are synthesized in the liver and to a lesser extent in the intestine and stomach. The muscle does not synthesize triacyl glycerols or wax ester to any significant amount. When fatty alcohol is injected intravenously (in vivo studies), it is massively oxidized to fatty acid, most of which appears in the muscle. Apparently, the liver exports free fatty acids and triacyl glycerols to serum and then to muscle. The free fatty acids, triacyl glycerols, wax esters, and cholesterol esters are turned over within 48 hr. in the serum; the turnover of triacyl glycerols greatly exceeds the turnover of alkyl diacyl glycerols. This relative conservation of alkyl diacyl glycerols may reflect their possible role in buoyancy. The striking ability of Squalus to synthesize wax esters may reflect an important role for this lipid class in transporting "essential" fatty acids in serum.

[1 figure, 2 tables, 14 references]

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9.16 FISH FARMING MACHINES FROM JAPAN

Anonymous Fishing News International 11, No. 8, 52-53 (Aug. 1972)

The Japanese have been developing commercial aquaculture fisheries projects for locations in waters at least 60 m. deep. Cage-type structures have been used in the past in shallow water to rear food fish or maintain bait fish until ready for use. The spread of pollution has reduced the areas near shore for this type of aquaculture causing development of deeper water methods.

A Japanese fishing company and an engineering company, in collaboration with the government's Fisheries Agency have caused to be designed and constructed for test purposes a durable fish preserve which could be set in deep water.

The submarine fish rearing plant is an eight-sided cage constructed of steel pipe frames and wire mesh. It measures 10 m. wide by 5 m. high, and has a volume of 368 cu. m. In the center a cylindrical steel tank, 2.5 m. in diam. and 7.5 m. high, provides controlled buoyancy through compressed air and controls located in it. The depth to which the cage is submerged can be controlled by radio. The cage will normally be near the surface; in bad weather a signal will cause the cage to submerge. The cage has an inner lining of fiber net which can be gathered upwards when the fish are harvested. The fish will be fed manually from a service boat or automatically through a hose. Successful application of this offshore method could extend the area of the sea for aquaculture.

A team was formed by the Japanese Fishing Agency and the Fisheries Experimental Station of the Hokkaido Government to develop efficient methods of cultivation and collection of shellfish through a block system approach. Each subteam or block was

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9.16 MARICULTURE COMES OF AGE

Gordon, Henry S. Chemical Engineering 79, No. 17, 26-28 (Aug. 7, 1972)

Mariculture, the controlled cultivation of fishery stocks, promises to become big business with the chemical process industries increasingly involved.

Union Carbide's affiliate, Ocean Systems, Inc., began a salmon cultivation project in 1970 that appears to be ready to give returns on the investment. Domsea Farms, Inc., is the new name of the firm. It has shortened the time from egg to market and is now marketing 1/2- to 3/4-lb. fish. Unilever, Ltd., has settled on salmon for its mariculture efforts in Scotland. The company is working on methods to promote faster, more uniform growth of salmon. Marifarms, Inc., of Panama City, Fla., has invested \$6 million into shrimp farming. This venture has yielded 500,000 lbs. of shrimp. Dow Chemical has been engaged in shrimp farming at Freeport, Tex., for about 3 years. The company has a grant from NOAA to work with Texas A & M University on shrimp culture research. Texas A & M has combined with Central Power & Light Co., of Corpus Christi, Tex., to investigate salinity in relation to shrimp culture and the feasibility of raising shrimp in a lake near a new generating station. Ralston Purina is involved in supplying feed for shrimp farming and importing shrimp for its packing plants.

Managements of other generating plants are joining mariculture ventures to make use of thermal discharges to show critics thriving marine life in such waters.

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Sand, George X.

International Turtle and Tortoise Society Journal 6, No. 2, 24-27 (Mar.-Apr. 1972)  
(Reprinted from Ford Truck Times, Winter 1972)

The green turtle has been hunted for meat since the crews of Columbus found them on the Cayman Islands in the year 1503. Through the centuries other mariners have stopped off on the islands to replenish meat supplies. In addition, the kitchens of European and American hotels have been demanding turtle meat to be prepared into delicacies for their guests. By the year 1870 a shortage of turtles existed, and today extinction threatens.

Studies of the natural history of the turtle indicate that only one out of 500 hatchlings can survive through the egg stage and subsequent attacks of predators in the open ocean. Further, not until the female turtle is 6 years old will she lay her first eggs. At such a low rate of reproduction the turtle population would never increase without intervention by man.

To reverse the fortunes of the green turtle, Dr. Robert E. Schroeder, a marine scientist, organized an aquaculture business called Mariculture, Ltd., at Sand Creek on Grand Cayman Island. In the facility a breeding pond and beach is provided where females can lay their eggs. Starting tanks protect hatchlings and large rearing tanks hold growing young turtles. In this arrangement turtles are being released to the sea and others are held back to grow to a 160-lb. marketable weight. Thus two purposes are being served: The pressure on the turtle population by meat hunters will be relieved, and additions to the sea population are provided.

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Norris, Kenneth S. (Oceanic Institute, Waimanalo, HI 96795), William D. Madden, and Phyllis S. Norris

In Oceanic Institute Report No. OI-72-78-1, A Feasibility Pilot Project for a Method of Open Water Fish Farming, pp. 1-21 (June 1, 1972). No price quoted. Final Report, NOAA Sea Grant No. GH-78. (Oceanic Institute, Makapuu Oceanic Center, Waimanalo. HI 96795)

Mariculture competes with other activities for space at the sea surface. An alternative is to use the sea bottom for mariculture; unused areas of sea floor are noncompetitive with other uses.

Uses of undersea mariculture envisioned are for development of habitat enhancement areas with plastic grass beds made of plastic strips, either enclosed by nets or open, the development of herbivore and carnivore trapping areas, algal rope or net culture, and shellfish culture.

A 6 x 12.5 m. PVC pipe frame was anchored in 26 m. of water off Oahu, Hawaii. Attached to the frame were 4,500 2.5-m. long, 10-cm. wide strips of plastic; each strip had a buoyant bubble plastic border which caused it to float vertically in the water. The course of the microflora and fauna establishment on this bed, including invasion by local fishes, was followed for 5 months. A maximum standing crop of algae was attained in 3 weeks, although the composition of the biota fluctuated constantly. At maximum growth the biota consisted of incrustated algal colonies, diatom films, some barely visible foliose and branching colonies, including hydroids, flagellates, minute worms and molluscs, and a colony of sea hares. The largest organisms lived on the plastic strips constantly. Heavy grazing by passing fish and the hares was observed. Fish of 15 species gathered around or in

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Silliman, Ralph P. (National Marine Fisheries Service, Northwest Fisheries Center, 2725 Montlake Boulevard East, Seattle, WA 98112)  
Fishery Bulletin 70, No. 3, 693-698 (July 1972)

An experiment was performed to assess the effect of crowding on yield in Tilapia macrocephala. Populations of nearly equal number and weight were started in control (155.2 liter) and test (77.6 liter) tanks. Food amounts and environmental attributes other than space were the same for both tanks. Each of the two populations was exploited--first at a bimonthly rate of 10% for 14 months, then at a bimonthly rate of 25% for 10 months.

Equilibrium yields at each rate for each tank (four points) were fitted with a Fox exponential surplus-yield model. Deviations from this general population curve showed that yields were greater for the larger tank at the 25% rate and greater for the smaller tank at the 10% rate. This is believed to result from the fact that the entire yield came from growth at the lower rate whereas part of the yield came from recruitment at the higher rate. A low rate of conversion of food to fish (18%) is believed to be due to the large proportion of liver in the diet. [3 figures, 3 tables, 7 references]

Author's abstract

Iles, T. D., and J. F. Caddy (St. Andrew's Biological Station, Fisheries Research Board of Canada, New Brunswick, Canada)  
World Fishing 21, No. 6, 14-16 (June 1972)

A fishery on Georges Bank for prespawning and spawning herring was started by Russian fleets in 1961; intensity of fishing increased with participation of other European vessels until 1968, when 400,000 tons were caught. In 1969, catches fell and a decline of 95% in the herring stocks was calculated. This conclusion was not consistent with a calculation, derived from catch per effort data, that a 75% decrease had occurred.

To investigate this discrepancy in estimates of stock decline (and for other studies) a combined effort by personnel and equipment from Canadian, Russian, and United States fisheries services provided the opportunity.

The Russian research vessel Aliferas had mapped a spawning area by grab sampling and had floated a radar buoy to mark its center. The U.S. research vessel Albatross IV, carrying the Canadian submersible Pisces I, sailed from Woods Hole, Mass. to rendezvous with the Aliferas.

Information gathered by Pisces I, using cameras and visual observation, indicated that the herring egg beds are on a flat, gravel-covered plain, which extends for miles in all directions at a depth of 50 m. A system of sand dunes was found that shifted on the gravel plain from year to year leaving clear gravel-covered areas for spawning.

Only a fraction of the gravel substrate had been used for spawning. The eggs formed a translucent, dark gray layer 1- to 2-cm. thick over the substrate (when

# 9.19 CHLORINATION AT POWER PLANTS: IMPACT ON PHYTOPLANKTON PRODUCTIVITY

Brook, Alan J., and Alan L. Baker (Department of Ecology and Behavioral Biology, University of Minnesota, Minneapolis, MN 55455) Science 176, No. 4042, 1414-1415 (June 30, 1972)

As a bacteriocidal agent, chlorine (in the form of hypochlorite or gaseous chlorine) acts to prevent fouling in cooling systems of power plants and as a reducer of biological oxygen demand at the site of sewage release.

Studies of the effects of passage through a power plant on river plankton were performed. Rates of photosynthesis and respiration were determined using the light-dark bottle incubation technique, and changes in the amount of dissolved oxygen were determined by Winkler titration.

During August and September 1971, river ambient temperatures were between 23° and 25° C. Temperatures of condenser discharges were between 32° and 36° C. Compared to control samples taken upstream, samples taken from discharge water without addition of chlorine showed a 5 to 15% depression of photosynthesis and up to 50% increase in respiration. After addition of chlorine (resulting in a concentration of 2,700 p.p.b.), photosynthesis was depressed to between 50 to 90%, and often there was no measurable respiration rate.

The data indicate that chlorination of cooling water depresses rates of photosynthesis and respiration of phytoplankton more than the heat of the water does.

The authors suggest that passing the chlorinated water through cooling towers may drive off the chlorine and restore the rates of photosynthesis and respiration.

[2 figures, 3 references] WS

9.17 (1.22)

freshly laid). At later stages, patches of dead eggs appeared, and the mass of eggs seemed to have lost their stickiness. Newly hatched larval herring, with yolk sacs attached, drifted just above the bottom in a cloud about 50 m. across and 10 to 15 cm. thick.

The amount of freshly laid eggs observed from Pisces I is equivalent to 13-20 kg. of eggs per square meter. This estimate is close to the maximum density found by the grab sampling survey from Alferas, but much higher than the average density found in the spawning area as a whole. The authors concluded that grab sampling underestimates the number of eggs laid, and consequently the size of the adult spawning population.

The uniformity of egg development on the bed suggests that the eggs were laid in a period of 1 to 2 days. Thus, large numbers of spawners must have congregated over small areas in a short time; under these conditions they are vulnerable to sophisticated sonar search techniques. When the spawning concentrations are located, although they may be only a remnant of the original herring stock, commercially valuable catches can be made. The authors concluded that these spawning herring concentrations need protection to allow the stocks to recover.

Regarding the value of a manned submersible or a surface vessel in acquiring information, there are uses to be found for both. Only the wide search from a surface vessel could have located the egg beds; detailed observations of the egg beds could have only been made from a manned submersible.

[2 figures, 4 photographs] WS

the beds, with the density of grazing Scarus spp. and Acanthurus spp. increasing during the observation period.

The plastic strips composed of polyethylene or olefin plastic showed signs of deterioration. Brittleness and cracking was evident. The textured surface of the olefin plastic tended to hold a reservoir of algae. The smooth surface of the polyethylene did not have the same attraction. The pipe frame required repairs within 9 months of submersion.

[4 figures, 2 tables, 6 references] WS

## 9.17 BIOLOGICAL EFFECTS OF FATTY ALCOHOLS ON FRESHWATER ANIMALS

Mann, Hans (Inst. Kuesten-Binnenfisch., Bundesforschungsanst. Fisch., Hamburg, Germany)

Chemical Abstracts 77, No. 1, 1486q (July 3, 1972)

Part of the activity of the aquaculture project is salvaging thousands of turtle eggs. Several older females, captured to serve as breeders have been laying their eggs at the facility which was located near a large area of grass for harvest of the grass for fodder in maintaining the turtles.

[6 photographs] MS

Data are listed on the concentration of elemental gaseous mercury in several homes, offices, and laboratories in the Dallas, Tex., area. The levels in these areas are substantially higher than those found in the ambient natural background. About 3 nanograms of mercury per cubic meter of air was found in San Francisco, Dallas, and Washington, D.C. The levels found in the air of the homes, offices, and laboratories ranged from 5.0 to 5,680 ng./m.<sup>3</sup>.

[1 table, 4 references]

FTP

## 9.19 MERCURY VAPOR CONCENTRATION INSIDE BUILDINGS

Footte, Robert S. (GeoSensors Inc., 9731 Denton Drive, Dallas, TX 75220) Science 177, No. 4048, 513-514 (Aug. 11, 1972)



9.19  
(0.6)

STABILITY OF ELEMENTAL PHOSPHORUS IN EDIBLE MUSCLE TISSUE  
OF COD DURING PROCESSING INCLUDING ICING, FREEZING AND  
THAWING, FROZEN STORAGE, SALTING, AND COOKING

Dyer, W. J., Doris F. Hiltz, R. G. Ackman, Joyce Hingley, G. L. Fletcher, and R. F. Addison (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)

Journal of the Fisheries Research Board of Canada 29, No. 7, 1053-1060 (July 1972)

Cod were exposed in vivo to elemental phosphorus in an aquarium under conditions previously described by W. J. Dyer, D. F. Hiltz, R. G. Ackman, J. Hingley, and G. L. Fletcher [J. Fish. Res. Bd. Canada 27, 1131-1139 (1970)]. These cod were then processed and stored by commercial procedures in order to determine the effect of these procedures on the stability of the elemental phosphorus in the edible flesh of the fish. The observations were made on iced round fish and fillets; frozen, stored, and thawed fillets; pickled fish; kench-salted fish; and cooked fish.

The elemental phosphorus in the white muscle of cod was stable when the fish was processed by regular commercial procedures. After iced storage of the cod, freezing and thawing, frozen storage, or cooking, from 40% to 100% of the elemental phosphorus in the muscle remained. Pickled-cod and kench-salted cod stored for 1½-2 months retained 25% or more of the original amount of elemental phosphorus. When the initial levels of elemental phosphorus in the muscle of the cod was 500 ng./g., the rate of decrease of the element during iced or frozen storage of the fish was very low; when the levels of elemental phosphorus were higher, the rate of decrease was much more rapid. Apparently the lipid in which the elemental

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9.19

METHANOL CLEANS UP IN SEWAGE

Anonymous

Chemical Week 111, No. 3, 35, 36 (July 19, 1972)

Municipal waste waters contain nitrogen; inorganic nitrogen in the form of ammonia averages 30 p.p.m. More than 60% of biological oxygen demand (BOD) of treated effluent results from oxidation of ammonia to nitrates by environmental plant life. Ammonia is toxic to some fish and corrosive to copper fittings. Nitrogen along with phosphorus and carbon is related to eutrophication of receiving bodies of water.

More than 25 states and several heavily populated bay and river basin areas have established nitrogen-control criteria for the effluent of treatment plants. Removal of nitrogen has become an important requirement in sewage treatment.

In the removal of nitrogen use of methanol has been found to be the most economical; the Environmental Protection Agency has found methanol to be the cheapest and purest organic material available for the purpose.

In conventional sewage treatment, filtration removes solids, chemical flocculation and filtration removes suspended solids, aeration reduces BOD, and in some cases, alum is added to precipitate phosphorus. Normally some nitrogen compounds are converted to nitrates during treatment to reduce BOD.

The new technique using methanol may require supplementary treatment to convert all nitrogen to nitrates. Then the sewage is contacted with an anaerobic sludge (in a closed system excluding air) and required amounts of methanol are injected into the system. The methanol provides a source of carbon for the bacteria which are converting the nitrates into free nitrogen gas and carbon dioxide.

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9.19

SPRAY DISPOSAL OF FOOD WASTE

Butters, J. R. (National College of Food Technology, Weybridge, England)  
Food Manufacture 47, No. 5, 29-32 (May 1972)

Food processors are facing growing problems in disposing of their wastes. Any disposal method which is cheap and which avoids the risk of polluting water-courses through oxygen depletion should be of interest to food processors. The method, which takes advantage of biological processes occurring when nontoxic liquid wastes percolate into the ground, is spray disposal.

The disposal of municipal waste liquors onto land has been practiced in Europe for many years. Land filtration was effective provided the soil was porous--sand and gravel gave satisfactory treatment at effluent rates as high as 30,000 gal./acre/day. Less porous soils necessitate reducing the flow or are not suitable for this type of disposal.

Spray disposal of liquid industrial wastes onto land is a new development. Food wastes and domestic sewage are similar; however, food wastes contain larger amounts of organic matter resulting in higher biological oxygen demand (BOD). Therefore, to make effective use of the land filtration method, dilution of food wastes may be necessary.

The land filtration spray method has been adopted by food manufacturers because of lower relative costs of equipment which will be operated seasonally, especially in fruit and vegetable processing. Part of the costs may be recovered by raising crops on the sprayed land.

A requirement in the disposal of food wastes by the spray irrigation method is the availability of an adequate area of land, not too distant from the factory.

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9.19

MICROBIAL UPTAKE OF LEAD

Tornabene, T. G. (Department of Microbiology, Colorado State University, Fort Collins, CO 80521), and H. W. Edwards (Department of Mechanical Engineering, Colorado State University)

Science 176, No. 4041, 1334-1335 (June 23, 1972)

As part of an overall research program to examine the possibility that there is a lead cycle in nature for which animals are the focal point, the authors studied the effects of certain inorganic lead salts on several microorganisms. Earlier work by other researchers indicated that lead causes a marked increase in the resistance of red cells to hypotonic saline solutions, is of questionable toxicity to Azotobacter, and does not affect specific cell functions. Also, it has been reported that lead can affect respiration in cell-free extracts of corn mitochondria; however, the effect of inorganic lead on whole cells might be different if lead must first penetrate the cell membrane. This paper reports on the immobilization of inorganic lead by microbial cells and the fraction of immobilized lead that passes through the cell envelope into the cytoplasm.

Micrococcus luteus and Azotobacter sp. cells were grown in broth in contact with a dialysis membrane containing lead bromide. The M. luteus immobilized 4.9 x 10<sup>2</sup> mg. of lead per gram of whole cells (dry weight basis), and Azotobacter sp. immobilized 3.1 x 10<sup>2</sup> mg./g. Apparently, lead bromide, lead iodide, and lead bromochloride in concentrations approaching solubility limits have no detectable effect on overall growth rate of the organisms and viability of the cells. Fractions of the cell wall plus membrane of the M. luteus contained 99.3% of the lead found associated with this organism; the same fractions of the Azotobacter sp. contained

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99.1% of the lead associated with the organism. The remainder of the lead was associated with the cytoplasmic fractions.

The authors concluded that the microbial systems examined are capable of abstracting substantial quantities of inorganic lead. Further, the immobilized lead is mostly associated with the cell membranes, and almost none is found associated with the cytoplasmic fractions. Therefore, immobilization of lead by microbial systems may have significance in terms of transfer of lead through the food chain.

ETP

[2] tables, 14 references]

Chemical Abstracts 77, No. 3, 15211h (July 17, 1972)

Suzuki, Tsuguyoshi, Junko Matsubara-Khan, and Akira Matsuda (Fac. Med., Univ Tokyo, Tokyo, Japan)

MERCURY CONTENT OF HAIR OF JAPANESE AFTER EMIGRATION  
TO BURMA OR EAST PAKISTAN

9.19

Use of the land depends upon soil drainage characteristics, nature of crop cover, climate-temperature, and rainfall. The area to be used must be increased as the volume of waste increases. The land should be relatively flat and even. Any slopes over 5-6% risk pollution of nearby watercourses, and level land avoids ponding. A geological survey must show absence of cracks and fissures in the underlying strata that could lead to contamination of underground watercourses.

Strong winds can carry fine droplets beyond the sprayed area. A windbreak could prevent a nuisance in the surrounding areas. Spraying into woodland would overcome the problem. The volume of liquor that can be applied to a given area without deleterious effects can be increased by presence of a crop cover. The most suitable crop is reported to be pasture grass.

To avoid blockage of pipelines and spray heads, solid particles should be screened out. The composition of the waste liquors must be acceptable to the crop and the soil. Mineral and organic content and pH must not be injurious. Alkaline cleaning agents (sodium) must be diluted to below 100 mg./l. before disposal.

The U.S. Soil Conservation Service recommends rates of application to crop covered soil from 45,000 gal./acre/hr. for coarse sandy soils to 3,400 gal./acre/hr. for clay soils.

The method neither pollutes the environment nor disturbs the ecology.

f1 table. 15 references]

MS

### 9.19 CARBONATE AND PHOSPHATE DETERGENT BUILDERS:

Jungermann, E., and H. C. Silberman (Armour-Dial, Inc., Chicago, IL 60608).  
Journal of the American Oil Chemists' Society **49**, No. 8, 481-484 (Aug. 1972).

This article is a critical review of the impact of detergent builders on the environment and is based on a review of the literature, material balance calculations, wastewater treatment experiments, and aquatic toxicity studies. The wastewater treatment experiments assessed the influence of alkalinity and carbonates on various sewage treatment processes. Apparently, carbonate detergent builders have no detrimental effect on sewage treatment. The carbonate detergents are no more toxic to fish than are phosphate detergents.

[9 tables, 48 references]

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[4 figures, 4 tables, 8 references]

phosphorus was probably dissolved served to protect the element up to a certain threshold value.

9.19 (0.6)

8.51  
(0.35) A COMPILATION OF AMINO ACID ANALYSES OF PROTEINS. II

Kirschenbaum, Donald M. (Department of Biochemistry, College of Medicine, Downstate Medical Center, Brooklyn, NY 11203)  
Analytical Biochemistry 49, No. 1, 248-266 (Sept. 1972)

In part I of this series [Anal. Biochem. 44, 159 (1971)], the author had compiled the amino-acid analyses of 120 proteins from data published between 1966 and 1971. In this part (II), an additional 148 amino-acid analyses have been added, and the data include information published from 1960 to the present time. [2 tables, 12 + 97 references] FTP

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Madison, Ohio: and one in El Lago, Tex.

Systems using methanol will be located in the following areas: District of Columbia, Waukegan, Ill., Contra Costa County, Calif., and Flint, Mich.; others in Hatfield Township, Pa., and Hobbs N.M. Two areas in Florida will use methanol treatment: Tampa Bay, and Orlando; two in the Midwest, Salt Creek, Ill., and

In experiments at a Lebanon, Ohio, plant, instead of using a sludge tank a down-flow column reactor was used for denitrification. The column is filled with small media (from sand to 3/4-in. stones) on which bacteria grow. Methanol is added to the column.

619



# BIODEGRADATION OF TRISODIUM NITRILOTRIACETATE IN A MODEL AERATED SEWAGE LAGOON

Rudd, J. W. M. (Dept. of Microbiology, University of Manitoba, Winnipeg, Manitoba, Canada), and R. D. Hamilton (Dept. of the Environment, Fisheries Research Board of Canada, Freshwater Institute, Winnipeg)  
Journal of the Fisheries Research Board of Canada 29, No. 8, 1203-1208 (Aug. 1972)

The trisodium salt of nitrilotriacetic acid (NTA) is considered an acceptable replacement for phosphate as a builder in detergents. However, NTA does not appear to occur widely in the environment, and questions have arisen concerning its effect upon humans and on the environment. Most of the NTA used in detergents might be expected to be exposed to some type of sewage treatment. Previous work has examined the effect of NTA loading in a number of sewage systems, and the results indicated that the efficiency of degradation of NTA is dependent upon temperature (and other factors). In certain parts of Canada sewage lagoons (aerated or unaerated) are operated at very low ambient temperatures (the mean daily temperature of the "mid-continental" area is below 0° C. for 5 months of the year). Should NTA become widely used in Canada, such sewage treatment systems might be a major source of NTA input to the aquatic ecosystem. In the present study, a model system was designed, constructed, and tested for its ability to reflect the operating characteristics of an actual lagoon, and then the model system was tested for its response to loading with NTA. The model aerated sewage lagoon has been described in Fishery Research Board of Canada Technical Report 294, (1972), 32 pp.

NTA was added to raw feed sewage at an equivalent level of 14 mg. NTA/liter (added as NTA-3Na · H<sub>2</sub>O at a rate of 20 mg./liter). The breakdown of incoming

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# BEHAVIORAL THERMOREGULATION BY FISHES: A NEW EXPERIMENTAL APPROACH

Neill, William H. (Honolulu Laboratory, Southwest Fisheries Center, National Marine Fisheries Service, Honolulu, HA 96812), John J. Magnuson, and Gerald G. Chipman (Laboratory of Limnology, University of Wisconsin, Madison, WI 53706)  
Science 176, No. 4042, 1443-1445 (June 30, 1972)

Discharges from steam-electric powerplants heat the receiving waters unevenly and cause strong spatial variations in temperature. Where fishes lie in such waters determines the metabolic and ecological effects that occur.

Fishes can exert behavioral control over temperatures they experience by swimming into, or remaining in, areas of acceptable temperatures, or by avoiding unacceptable temperatures. Understanding this behavior is important in predicting the ecological impact of heated effluents.

Experiments on behavioral thermoregulation by fishes were performed. A tank was divided into two compartments with access from one to the other. The compartments had heating and cooling capability, and different temperature conditions were maintained in each.

A fish could control environmental temperature by dividing its time between the compartments as follows: passage of the fish into the right compartment causes the temperature to rise at a rate of 3° to 5° C. per hour. The warming stops only when the fish enters the left compartment; then the right side begins cooling at the rate of 3° to 5° C. per hour. The temperature of the left compartment is kept 2° C. lower than the right; thus, the fish always has available alternative temperatures 2° C. apart. By choosing one temperature over another the fish serves as its own thermostat.

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# MOBILIZATION OF MERCURY FROM SEDIMENTS INTO GUPPIES (POECILIA RETICULATA)

Gillespie, D. C. (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba R3T 2N6, Canada)  
Journal of the Fisheries Research Board of Canada 29, No. 7, 1035-1041 (July 1972)

Mercury apparently enters fish through the food chain, by direct absorption through the gills, or both. Earlier work by the author and coworker showed a relatively rapid transfer of mercury from sediments (containing added mercurials) to fish. The present article reports additional work on the mobilization of mercury from sediments into guppies.

Guppies were exposed in aquaria to aerobic and to anaerobic sediments to which various forms of mercury (mercury metal, mercuric chloride, and mercuric sulfide) were added, and to sediments from two sites of industrial pollution. The levels of mercury in the whole body of the fish, as determined by atomic absorption analysis, were used as a measure of the mobilization of mercury by the fish from the sediments. In addition, checks for methyl mercury in the fish were carried out at intervals during the course of the experiments.

Under aerobic conditions little mobilization of mercury occurred in the fish exposed to sediments containing added mercuric chloride or mercuric sulfide; however, mobilization of mercury rose rapidly when the fish were exposed to sediments containing metallic mercury. The proportion of methylmercury in the guppies reached maxima of 30% for fish exposed to metallic mercury, 40% for fish exposed to mercuric chloride, and 45% for fish exposed to mercuric sulfide.

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# CHEMICAL STABILITY OF DDT AND RELATED COMPOUNDS IN SELECTED ALKALINE ENVIRONMENTS

Smith, Sammie, and James F. Parr (Soil and Water Conservation Research Division, Agricultural Research Service, U.S. Department of Agriculture, P.O. Drawer 1, University Station, Baton Rouge, LA 70803)  
Journal of Agricultural and Food Chemistry 20, No. 4, 839-841 (July-Aug. 1972)

Earlier work has shown that DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane] degrades more rapidly under biologically active, anaerobic conditions as compared with well-aerated (aerobic) conditions. However, little information is available on the chemical mechanisms that might contribute to the degradation of DDT in soils. DDT in a strongly alkaline alcohol solution does undergo dehydrochlorination. The question has arisen, then, whether certain fertilizers, alkaline in action, would accelerate the decomposition of the DDT present in the soils with the fertilizers. E. E. Fleck and H. L. Haller [Ind. Eng. Chem. 37, 403 (1945)] found that, of the fertilizers tested, only dolomitic limestone showed catalytic activity to dehydrochlorinate DDT. The present article reports on the effect of specific alkaline environments (including anhydrous ammonia) on the chemical stability of DDT and related compounds, and the critical pH values affecting their stability. Glass microbeads (diameter from 53 to 74  $\mu$ ) were used as the synthetic medium for studying the effect of alkalinity on the stability of DDT and related compounds; Crowley silt loam from the Louisiana rice area was used as the soil medium.

DDT was stable in soil treated with anhydrous ammonia at pH > 10.0 and was stable in sterile buffered, glass microbeads at pH values up to 12.0. The

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9.19 ROOTED AQUATIC PLANTS MAY BE MERCURY LINK TO MAN'S FOOD CHAIN

Anonymous  
RHSMHA Health Repts 87, No. 2, 133-134 (1972)  
BHMIRA Abstracts 25, No. 8, Abstract No. 2857, 572 (Aug. 1972)

Recent research has shown that water milfoil takes up mercury compounds from polluted sediments. It is suggested that other rooted plants may take up mercury in a similar way and that in areas where polluted sediments are known to exist, considerable quantities of mercury may be removed from the system by harvesting the water plants. L.P.  
Reprinted

DLF [secunref 61, selat 3, saungif 3]

numismatist...  
In nature, the present study, it appears that in a short term (days) forms of mercury other than methylmercury are a significant proportion of the total mercury in fish in the fish.  
In nature, the present study, it appears that in a short term (days) forms of mercury other than methylmercury are a significant proportion of the total mercury in fish in the fish.

9.19 LEAD CONTENT OF FISH FROM 49 NEW YORK STATE WATERS (8.42)

Pakkala, Irene S., Merrile N. White, George E. Burdick, Earl J. Harris, and Donald J. Risk (New York State Coll. Agric., Cornell Univ., Ithaca, N.Y.)  
Chemical Abstracts 77, No. 3, 15184b (July 17, 1972)

DLF [secunref 61, selat 3, saungif 3]

phenyl(ethylene) in the microbeads was 12.5; extensive conversion (> 70%) occurred at pH 13.0. DDE applied to microbeads was relatively stable at pH 13.0 even up to 7 days; however, after extended incubation to 28 days, DDE disappeared gradually to 88% at pH 13.0 and 74% at pH 13.0. Similar results were observed in tests of the effect of pH on the dehydrochlorination of DDD (p-chlorophenyl(ethylene)). DDD was stable for extended periods at pH 10.0, 10.5, and 11.0, but it converted rapidly to DDMU at pH 13.0. It is unlikely that any natural environment would have a pH higher than 10.0 to 10.5, and that any strongly alkaline materials introduced into the environment would tend to undergo neutralization by atmospheric CO<sub>2</sub>. However, under environmental conditions, the important considerations would be the initial, artificially induced pH and the time required for neutralization (which might be sufficient to effect chemical changes in the pesticide residues that might be present).

9.19 EFFECTS OF DDT ON CATIONS IN THE HEPATOPANCREAS OF PENAEID SHRIMP

Nimmo, D. R., and Robbin R. Blackman (Environmental Protection Agency, Gulf Breeze Laboratory, Sabine Island, Gulf Breeze, FL 32561)  
Transactions of the American Fisheries Society 101, No. 4, 547-549 (July 1972)

In earlier work on the effect of DDT in penaeid shrimp, involving both acute and chronic tests, the senior author and his colleagues found that the shrimp accumulated more DDT in the hepatopancreas than in other organs. In the present study, the authors demonstrate that when shrimp are exposed to DDT, the levels of some cations (sodium and potassium) in the hepatopancreas become lower than that in control shrimp. The authors preferred the explanation (from previous work) for these results: DDT interferes with the adenosine triphosphatases involved in active transport of cations into the hepatopancreas, thus failing to balance the normal efflux.  
[1 table, 12 references]

DLF [secunref 81, selat 2, saungif 3]

VA...  
The authors found that the hepatopancreas of shrimp exposed to DDT contained lower levels of sodium and potassium than control shrimp. This was attributed to the interference of DDT with the active transport of cations into the hepatopancreas, which is normally balanced by the efflux of cations.

9.19 PESTICIDES AND HEAVY METALS IN THE AQUATIC ENVIRONMENT

Morris, Robert L., Lauren G. Johnson, and D. W. Ebert (State Hyg. Lab., Iowa City, Iowa)  
Chemical Abstracts 77, No. 4, 24592k (July 24, 1972)

DLF [secunref 81, selat 2, saungif 3]

MS [secunref 5, saungif 2]  
The authors found that the hepatopancreas of shrimp exposed to DDT contained lower levels of sodium and potassium than control shrimp. This was attributed to the interference of DDT with the active transport of cations into the hepatopancreas, which is normally balanced by the efflux of cations.



9.19 PETROLEUM HYDROCARBONS: UPTAKE AND DISCHARGE  
(9.15)  
BY THE MARINE MUSSEL *MYTILUS EDULIS*

Lee, Richard F., Richard Sauerheber, and A. A. Benson (Scripps Institution of Oceanography, University of California, La Jolla, CA 92037)  
Science 177, No. 4046, 344-346 (July 28, 1972)

In experiments with the common marine mussel *M. edulis*, uptake and discharge of several petroleum hydrocarbons was observed. The following aromatic and polycyclic aromatic compounds were selected because of their toxic or carcinogenic properties: 3,4-benzopyrene, naphthalene, 1,2,3,4-tetrahydronaphthalene (tetralin), and toluene. Mineral oil and heptadecane were selected as examples of nontoxic paraffinic hydrocarbons. Heptadecane also occurs naturally in many marine organisms.

Various concentrations of these compounds were prepared in sea water. Young mussels (0.10 g. without shell), collected off the pier at the Scripps Institution, were placed in 2-liter beakers containing the solutions. Air was continuously bubbled into the beakers.

Parallel studies were conducted in which the mussels were exposed to the following radioactive hydrocarbons (in sea water): [<sup>14</sup>C]-4-benzopyrene, [<sup>14</sup>C]-toluene, [<sup>14</sup>C]-naphthalene, and [<sup>14</sup>C]-heptadecane. Hydrocarbon uptake was determined quantitatively by gas-liquid chromatography, thin-layer chromatography, and spectrophotometry. Activity of radioactive hydrocarbons in tissue extracts was determined by scintillation counter.

The naturally occurring hydrocarbon content is about 1 mg. per mussel; analysis of these hydrocarbons showed a series of straight chains and branched chains (over)

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9.19 MICROBIAL DEGRADATION OF DDT METABOLITES TO CARBON DIOXIDE,  
WATER, AND CHLORIDE

Focht, D. D. (Department of Soil Science and Agricultural Engineering, University of California, Riverside, Calif.)  
Bulletin of Environmental Contamination and Toxicology 7, No. 1, 52-56 (Jan. 1972)

The problem of DDT in the environment is its persistence in soil and water ecosystems. In previous work, degradation of DDT through reactions brought about by the action of *A. aerogenes* was demonstrated. One of the degradation products was 2,2'-dichlorophenylmethane (DDM) which was converted to p-chlorophenylacetic acid; other organisms of the *Hydrogenomonas* spp. were able to split the benzene rings of the latter. The organisms were unable to dehalogenate the products resulting from the splitting of the benzene rings.

An organism was found which was capable of converting the chlorinated bacterial degradation products to H<sub>2</sub>O, CO<sub>2</sub>, and HCl. This organism was a fungus obtained from sewage effluent by selective culture with 3-chloro-cis-crotonic acid (3-CCC) as the sole carbon source in mineral salts medium. The resulting growth was streaked onto agar plates and a pure culture was obtained. It was maintained in liquid media and on agar slants containing 3-CCC at a concentration of 1.000 p.p.m. The fungus isolate was identified as a hyaline [transparent] member of the family Mucillaginaceae, producing fusiform phialoconidia [saucer-shaped] conidia [asexually formed spores] in slimy clusters or in long chains.

Suspensions of *Hydrogenomonas* spp. were inoculated in media containing either DDM or p-chlorophenylacetic acid; the products resulting from the cell metabolism were extracted. The extracts were added to basal salts media, purged with N<sub>2</sub> gas, (over)

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9.2 R AND D RESOURCE ALLOCATION--A QUANTITATIVE AID

Block, Robert G. (Air Force Avionics Laboratory, Wright-Patterson AFB, Dayton, OH 45433)  
Research/Development 23, No. 8, 20-24 (Aug. 1972)  
Card A

This article describes an evaluation method developed to give quantitative aid to R and D managers faced with limited budgets and proposed programs of widely varying potential payoffs, stages of advancement, and resource requirements. The methodology was developed to aid the Air Force Avionics Laboratory in the allocation of its R and D funds.

The Avionics Laboratory management allocates funds among various projects. These projects are subdivided into task areas, and the task into work units. A work unit is the smallest identifiable level of effort within the laboratory. The end product of the evaluation method was a list of 46 proposed work units which required ranking numerically according to funding priority.

This method of evaluation should not be allowed to interfere with the rapport among supervisors and their manager and between other members of the organization. Participation by all managers is recommended. Furthermore, the evaluation technique must be flexible in relation to the constantly changing environment of the system. The environment influences the balance between research and development, it is the function of management to set guide lines for establishing and maintaining a balance between the two.

As a first step, the work units must be evaluated against the overall goals of the organization. An evaluation of only the relative worth of each unit is inadequate since a ranking based on such a scale is deficient for the following reasons: it is difficult to determine the appropriate funding level; low priority (over)

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9.2 R AND D RESOURCE ALLOCATION--A QUANTITATIVE AID

Block, Robert G. (Air Force Avionics Laboratory, Wright-Patterson AFB, Dayton, OH 45433)  
Research/Development 23, No. 8, 20-24 (Aug. 1972)  
Card B

Success Factor (SF). This factor is obtained in the equation  
 $SF = \{f(CL)f(OI)\}/f(\$)$

where: f(CL) is a function of confidence level, f(OI) is a function of objective importance, f(\$) is a function of funds projected. Confidence levels are based on a scale of definitions: from "problem can be defined," level 0.2, to "technology adequate, detailed design criteria established," level 1.0.

Industrial Funding Factor (IFF). This factor is indicative of the likelihood that a user division will support the work unit. The scale runs from: definitely, at 1.0 to remote chance, at 0.2.

Percentile Composite Score (PCS) would be computed as follows:

$$PCS = \sum_{i=1}^n \frac{RP_i W_i}{100} = \frac{\sum_{i=1}^n RP_i W_i}{n - RP_i + 1} \times \frac{W_i}{n} \quad (5)$$

where:  $RP_i$  = rank of work unit's score for the  $i$ th factor

$RP_i$  = rank percentile for the  $i$ th factor =  $[1 - (RP_i - 1)/n] \times 100$

$W_i$  = weighting out of 100 assigned to the  $i$ th factor in the total evaluation  
As the evaluation technique was applied in this case  $i$  was set to equal 4 for the four factors OI, EFF, SF, and IFF, and the percentile composite score for final (over)

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9.19

and filter sterilized. Each medium containing metabolic products of DDM or p-chlorophenylacetic acid (except the controls) was inoculated with the fungal isolate grown on slant cultures.

Growth was evident in 5 days. The supernatant liquids of both media were positive to chloride tests; uninoculated controls were negative. The breakdown of DDM and p-chlorophenylacetic acid (DDT metabolites) to CO<sub>2</sub>, H<sub>2</sub>O, and HCl was clearly established.

Furthermore, fungal growth in the system is totally dependent on degradation products excreted by the bacteria (*Hydrogenomonas* spp.). In order to maintain the level of degradation of DDM by the fungus and to maintain the growth of the bacteria, an energy source external to the system is needed because no energy can be supplied by the cometabolism of DDM. If too much of an energy source is supplied bacterial growth will overwhelm fungal growth. When conditions are optimal for both organisms degradation of DDM can proceed. Future studies relative to metabolism of persistent molecules such as DDM should consider use of mixed rather than pure cultures; the situation that occurs in nature consists of mixed cultures on a multiplicity of substrates.

[1 figure, 3 tables, 5 references]

SW

9.2

ranking is given as:

$$PCS = \frac{(n-R_{OI} + 1)W_{OI} + (n-R_{EFF} + 1)W_{EFF}}{n} + \frac{(n-R_{SF} + 1)W_{SF} + (n-R_{IFF} + 1)W_{IFF}}{n} \quad (6)$$

The maximum possible score, according to equation (5) and (6) is 100--the case in which one work unit ranks first in all factors.

The author suggests that if this evaluation technique is to be valuable to managers they must not only understand it but also accept it; otherwise, another technique is recommended.

[4 tables, 8 references]

SW

Ventz, D. (Wasserwirtschaftsdire. Kueste-Warnow-Peene, Stralsund, E. Germany) Chemical Abstracts 77, No. 10, 66027k (Sept. 4, 1972)

#### 9.19 ASPECTS OF WASTE WATER TREATMENT IN THE FISHING INDUSTRY

9.19 (9.15)

from C16 to C26. The major components were pristane, (a branched C19), eicosene (C20 with one double bond), and heneicosahexaene (C21 with six double bonds).

Between 10 and 15 mg. of mineral oil was taken up by each mussel within 2 days after immersion without any ill effects. Longer exposures did not result in further uptake. No significant alteration of the mineral oil after 6 days' exposure was observed. Mussels exposed to mineral oil for 3 days and then transferred into sea water free of hydrocarbons discharged 90% of the mineral oil.

The pattern of uptake and discharge of [<sup>14</sup>C]heptadecane was similar to that of mineral oil. Tetralin was highly toxic at 100 p.p.m. and, at lower concentrations, caused inability of the mussel to close its open shell. Only 3 to 10 mg. each of [<sup>14</sup>C]naphthalene, [<sup>14</sup>C]toluene, and [<sup>3</sup>H]3,4-benzopyrene were taken up by the mussels. Toluene, naphthalene, and benzopyrene did not have a lethal effect at the concentrations used.

By autoradiography the authors demonstrated that the radioactive compounds tested were not metabolized by the mussels. All the hydrocarbons tested were rapidly taken up by the gill tissue.

[2 tables, 10 references]

SW

9.2

tasks may never be considered; it is difficult to choose between tasks of equivalent priority that use different allocations of resources and are at different stages of development; and there can be no balance between systems requirements and long-range applications.

To achieve proper balance between systems requirements and long-range applications, work units should be separated into two groups--subsystems and technical base. The present environment dictates the funding ratio--75% subsystems and 25% technical base. This method injects flexibility into the system since the ratio can be varied depending on the environment. Once this ratio has been established, funds must not be shifted from one category to another.

Four factors were considered and given weights indicative of the current R and D climate: objective importance, efficiency, success, and industrial funding. The factors can be calculated using the following methods.

Objective Importance Factor (OI). This factor is obtained in the equation:

$$OI = [TAR] [IF] \text{ where: } TAR = \text{Technical Areas Rating}$$

IF = Importance Factor

Values of OI are ranked and assigned a rank percentile in the equation:

$$RP_{OI} = \left(1 - \frac{OI - 1}{n}\right) \times 100\%$$

Where: RP = Rank percentile, n = number of work units evaluated

Efficiency Factor (EFF). This factor is obtained in the equation

$$EFF = [OI] / f(\$ , my)$$

Where: [OI] = the objective importance factor

f(\$ , my) = a function of dollars and manyears.

The dollar figure and my refers to the funds projected for the work unit, and the manpower per year to be consumed.

[Continued on Card B]



TRENDS IN USE AND PROSPECTS FOR THE FUTURE HARVEST  
OF WORLD FISHERIES RESOURCES

Sprague, Lucian M., and John H. Arnold (International Center for Marine Resource Development, University of Rhode Island, 19 Upper College Road, Kingston, RH 02881)  
Journal of the American Oil Chemists' Society 49, No. 8, 345A-350A (Aug. 1972)

The authors believe that the yield of marine fishes could be expanded to about 400 million metric tons by harvesting presently known but underutilized species, by opening new fishing areas (such as in the Indian Ocean and Antarctic areas), and by improved management of the fisheries. They believe, further, that we will have to harvest at a lower trophic level in order to meet the maximum potential because most of the fish in higher trophic levels are being harvested at their maximum sustainable yields. The harvest of smaller fish and the increasing demand for fishmeal in animal feeds will result in an increasing proportion of the fish harvested to be used for production of fishmeal and oil.

[3 figures, 7 tables, 15 references]

FTP

ATTITUDES REGARDING A LAW OF THE SEA CONVENTION  
TO ESTABLISH AN INTERNATIONAL SEABED REGIME

[Authors and titles listed below]

University of North Carolina School of Law, Sea Grant Publication, iv + 143 pp.  
(Apr. 1972). Price \$2.00.

In the Introduction, Seymour W. Wurfel indicated that the 11 papers in this report were prepared by students of International Law at the School of Law of the University of North Carolina in the fall of 1971. These papers examine various national and special interest attitudes toward a seabed regime as these relate to the proposed Draft Convention on the International Seabed Area submitted to the United Nations in August 1970 by the United States Government. The papers are as follows:

"Introduction," by Seymour W. Wurfel, pp. i-ii.

"Japan's Position on a Seabed Regime Convention and Territorial Waters," by C. David Benbow, pp. 1-18. [4 tables, 34 footnotes]

"Canada and the Proposed International Seabed Convention: A Challenge to International Law," by W. Thomas White, pp. 19-33. [46 footnotes]

"Positions That the Central American States Mexico and Cuba May Take Concerning the International Seabed Conference," by Jan H. Samet, pp. 34-53. [3 appendices, 15 footnotes]

"The Legal Regime of Brazilian Territorial Waters," by Robert L. Fuerst, pp. 54-69. [40 footnotes]

"The Probable National Positions of Great Britain and Ireland on the Establishment of an International Seabed Regime," by Keith Douglas Lembo, pp. 70-79. [12 footnotes]

(over)

U.S. CALLS FOR PROMPT INTERNATIONAL ACTION TO SETTLE  
PROBLEMS OF LAW OF THE SEA

Stevenson, John R. (U.S. Representative to the U.N. Committee on the Peaceful Uses of the Seabed and the Ocean Floor Beyond the Limits of National Jurisdiction)  
Department of State Bulletin 67, No. 1736, 382-386 (Oct. 2, 1972)

This statement was made by the author in plenary session of the U.S. Committee on the Peaceful Uses of the Seabed and the Ocean Floor Beyond the Limits of National Jurisdiction in Geneva on Aug. 10, 1972. The following material was extracted from the author's statement.

"...in order to achieve agreement [on solutions to law of the sea problems], we are prepared to agree to broad coastal state economic jurisdiction in adjacent waters and seabed areas beyond the territorial sea as part of an overall law-of-the-sea settlement. However, the jurisdiction of the coastal state to manage the resources in these areas must be tempered by international standards which will offer reasonable prospects that the interests of other states and the international community will be protected. It is essential that coastal state jurisdiction over fisheries and over the mineral resources of the continental margins be subject to international standards and compulsory settlement of disputes.

"We can accept virtually complete coastal state resource-management jurisdiction over resources in adjacent seabed areas if this jurisdiction is subject to international treaty limitation in five respects:

1. International treaty standards to prevent unreasonable interference with other uses of the ocean....

(over)

RESEARCH AND THE FISHERIES SERVICE'S  
SECOND 100 YEARS

Roedel, Philip M. (National Marine Fisheries Service, Washington, DC 20235)  
Fishery Bulletin 70, No. 3, 537-539 (July 1972)

In Century I, fisheries science moved from ichthyology into fisheries biology, added other biological disciplines such as physiology and genetics, accepted mathematics and statistics as integral to success, incorporated physical oceanography, engineering, and physics into the fold, touched on meteorology, became deeply involved with biochemistry and food science, and opened the door to economists and lawyers. The future will hold a greater role for the social sciences and the legal profession, but it will remain the fisheries scientist (whatever he may be--some mix of biologist, ecologist, oceanographer, and mathematician) who will provide the requisite scientific data with which other disciplines can interact to provide the final synthesis upon which the administrator can base his decision.

Research in the Fisheries Service at present falls into three major categories: (i) biological, ecological, and oceanographic research of the sort traditionally conducted by fisheries biologists, including fisheries oceanography, population dynamics, inshore ecology, studies of contaminants and disease, aquaculture, a smattering of gear technology and instrumentation, and so on; (ii) fishery technology and marketing research; and (iii) economic research, this of necessity growing to encompass matters of a social, institutional, or legal nature.

All of this is being carried on so that we may fulfill our mission as we see it: to promote the wise use of living marine resources for their aesthetic, economic, and recreational value to the American people. Our basic objectives within

(over)





0.115  
(0.5) STONACHING: A NEW CONCEPT IN BACTERIOLOGICAL SAMPLE PREPARATION

Sharpe, A. N., and A. K. Jackson (Unilever Research Laboratory Colworth/Welwyn, Colworth House, Sharnbrook, Bedford, England)  
Applied Microbiology 24, No. 2, 175-178 (Aug. 1972)

A mixing device is described that is particularly suitable for preparing suspensions from foods, fabrics, swabs, and other fairly soft materials for bacterial analyses. The sample and diluent are placed in a sterile plastic bag, and the filled bag is placed in the mixing machine. Moving paddles inside the machine vigorously pound the bag; the resulting compression and shearing forces effectively remove even deep-seated bacteria. After samples are taken for analyses, the bag and contents may be appropriately discarded. The apparatus is the subject of a patent application (British Patent Application No. 41395/71). The equipment was tested on the following products and has worked well: beef cuts, chicken, committed meats, processed beef, pastry, fruits, fresh vegetables, dried vegetables, fish, cream, fabrics, and swabs.

[2 figures, 1 table, 9 references]

FTP

Choi, Ho-Yuen, Kang-Ho Lee, and Ung Choi (Pusan Fish. Coll., Pusan, S. Korea)  
Chemical Abstracts 77, No. 5, 32669f (July 31, 1972)

0.1  
FERMENTATION OF FISH PROTEIN. 1. MODEL DESIGN OF FERMENTOR

COMMERCIAL FISHERIES ABSTRACTS VOL. 25 NO. 21 PAGE 29

0.8  
VACUUM TESTER FOR PACKAGES WITH FLEXIBLE COVERS

Pfeifer, Charles F. (39 Parade Hill Lane, New Canaan, CT 06840) (pat.)  
U.S. Patent 3,667,281  
Modern Packaging 75, No. 9, 110 (Sept. 1972)

This vacuum tester is nondestructive and is used for testing of vacuum packages, particularly those used in the packaging of meat and heat-and-serve products wherein one of the packaging members is flexible.

FTP

"Pilot-scale studies at Stillwell, Okla., have shown the feasibility of treating strong organic cameries waste waters by a two-stage activated-sludge process without pH adjustment of the waste water. The two-stage process was found to be stable and capable of accepting shock loads without adverse effects, and gave high rates of removal with high treatment efficiencies, giving reductions in BOD and COD of 99 and 90 per cent, respectively."

Hu, A. C.-H.  
Thesis, Univ. Oklahoma (1971), 207 pp.  
BPMIRA Abstracts 25, No. 8, Abstract No. 2989, 598 (Aug. 1972)

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2.00  
(8.8) VOLATILE COMPOUNDS PRODUCED IN GROUND MUSCLE TISSUE OF CANARY ROCKFISH (SEBASTES PINNIGER) STORED ON ICE

Miller, A., III, R. A. Scanlan, J. S. Lee, and L. M. Libbey (Dept. of Food Science and Technology, Oregon State University, Corvallis, OR 97331)  
Journal of the Fisheries Research Board of Canada 29, No. 8, 1125-1129 (Aug. 1972)

The objective of this study was to identify the volatile compounds associated with the autolytic and progressive microbial degradation of the raw rockfish S. pinniger stored at 0° C. The compounds were identified by combined gas-liquid chromatography and mass spectrometry. The compounds positively identified were dimethyl sulfide, n-propyl alcohol, acetaldehyde, propionaldehyde, acetone, ethyl alcohol, 2-pentanone, 3-pentanone, diacetyl, hexanal, 1-pentene-3-ol, 3-methyl-1-butanol, acetoin, trimethylamine, and dimethylamine. The compounds tentatively identified were propenal, octenal or octadienal, butyraldehyde, 3-methyl butanal, 2-butanone, and methyl vinyl ketone.

[2 figures, 1 table, 21 references]

FTP

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9.11  
THE OCEANS: GROWTH AND OXYGEN ISOTOPE EVOLUTION

Chase, C. G. (Department of Geology and Geophysics, University of Minnesota, Minneapolis, NM 55455), and Eugene C. Perry, Jr.  
Science 177, No. 4053, 992-994 (Sept. 15, 1972)

In order to model the oxygen isotope evolution of the oceans, the effect of the following four major processes on oceanic oxygen 18 were considered: (1) outgassing of mantle water to the oceans concurrent with volcanic and magmatic activity; (2) withdrawal of ocean water locked into the oceanic crust during sea floor spreading; (3) weathering of primary igneous rocks to form sediments; and (4) metamorphism of igneous and sedimentary rocks.

Calculations based on these processes indicated that the evolution of the oxygen 18/oxygen 16 ratio of the oceans is unlikely to have remained constant with time.

Relative constancy of oceanic volume was also suggested in terms of isotopic evolution; therefore, early formation of the oceans is more likely than linear growth. [2 figures, 12 references]

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